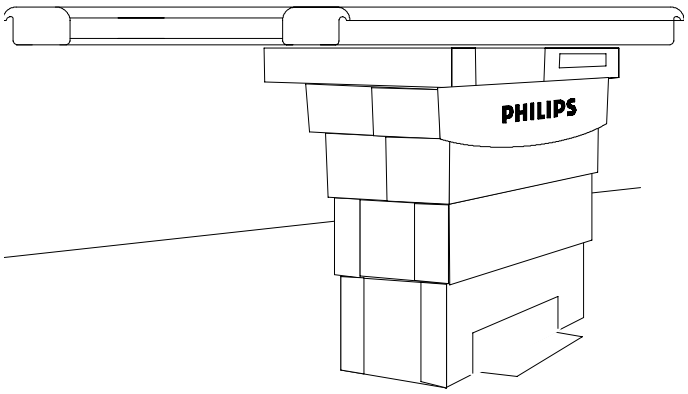
PHILIPS

Philips Medical Systems

BuckyDiagnost TH2 / TF (MSB)

9890 010 06503

LEVEL 1 DOCUMENTATION



This document and the information contained in it is strictly reserved for current Philips Medical Systems ("Philips") personnel, Philips licensed representatives and Philips customers who have purchased a valid service agreement for use by the customer's designated in-house service employee on equipment located at the customer's designated site. Use of this document by unauthorized persons is strictly prohibited. This document must be returned to Philips when the user is no longer licensed and in any event upon Philips' first written request.

Printed in Hamburg, Germany

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

INTRODUCTION AND TECHNICAL DATA 1

INSTALLATION 2

FAULT FINDING 3

REPLACEMENTS 4

PROGRAMMINGS 5

ADJUSTMENTS 6

ACCEPTANCE 7

SERVICE INFORMATION 8

DRAWINGS Z1

SCHEMATIC DIAGRAMS Z2
WIRING DIAGRAMS Z3

Proprietary Notice:
This document and the information contained in it is proprietary and confidential information of Philips Medical Systems ("Philips") and may not be reproduced, copied in whole or in part, adapted, modified, disclosed to others, or disseminated without the prior written permission of the Philips Legal Department. Use of this document and the information contained in it is strictly reserved for current Philips personnel and Philips customers who have a current and valid license from Philips for use by the customer's designated in-house service employee on equipment located at the customer's designated site. Use of this document by unauthorized persons is strictly prohibited. Report violation of these requirements to the Philips Legal Department. This document must be returned to Philips when the user is no longer licensed and in any event upon Philips' first written request.

Warranty Disclaimer Language:
Philips provides this DOCUMENT without warranty of any kind, implied or expressed, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

Limitations of Liability Language:
Philips has taken care to ensure the accuracy of this document. However, Philips assumes no liability for errors or omissions and reserves the right to make changes without further notice to any products herein to improve reliability, function, or design. Philips may make improvements or changes in the product(s) or program(s) described in this document at any time.

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

SERVICE MANUAL - SUBSYSTEM

BuckyDiagnost TH2 / TF (MSB)

Author: M. Bierstedt

Type No : 9890 010 06503

In case there are any questions concerning this manual,
please send this LOPAD via fax to 49/(0)40/5078 2481

File: BD_TH2_TF_MSB 29612Vers00

List of pages and drawings (LOPAD)

Manual Order No: 4512 984 29612
released: 06/2005

1 ... 4

1-0.1	**(05.0)**		
1-1...5	(05.0)		
2-0.1	**(05.0)**		
2-1...9	(05.0)		
3-0.1	**(05.0)**		
3-1...8	(05.0)		
4-0.1	**(05.0)**		
4-1...2	(05.0)		
6-0.1	**(05.0)**		
6-1...2	(05.0)		
Z-0.1	**(05.0)**		
Z-1.1	(04.0)	A3	4512 982 0096.
Z-1.2	(04.0)	A3	4512 982 0096.
2Z-10	(e/04.0)	A3	4512 983 05451
Z-0.2	**(05.0)**		
Z1-1	(a/05.0)	A3	DigiDiagn. TH
Z1-1.2	(05.0)	A3	
Z1-1.3	(05.0)	A3	
Z1-1.4	(05.0)	A3	
Z1-2	(05.0)	A3	
Z1-3	(d/05.0)	A3	DigiDiagn. TH
Z1-5	(05.0)	A3	DigiDiagn. TH
Z2-1	(05.0)	A3	
Z2-3	(05.0)	A3	
Z2-4	(a/05.0)	A3	DigiDiagn. TH
Z3-1.1	(04.1)	A4	DigiDiagn. TH
Z3-1.2	(05.0)	A3	DigiDiagn. TH
Z3-2.1	(04.1)	A4	DigiDiagn. TH
Z3-2.2	(04.1)	A4	DigiDiagn. TH
Z3-3.1	(05.2)	A3	DigiDiagn. VM
Z3-3.2	(05.0)	A3	DigiDiagn. VM
Z3-4.1	(05.0)	A3	BuckyDiag TH2

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

Blank page

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

INTRODUCTION AND TECHNICAL DATA

Contents **1-0.1**

1. Purpose of the manual **1-1**

2. Items supplied **1-1**

3. Compatibility **1-2**

4. Technical data **1-3**

4.1. Mechanical data 1-3
4.2. Environmental data 1-3
4.3. Electrical data 1-3
4.4. Tools / Material required 1-4
4.5. Network data 1-4
4.6. Remote service data 1-4
4.7. Transport data 1-4
4.8. Pre-installation requirements 1-4
4.9. Movements 1-4
4.10. Pre-installation data 1-4

5. Saftey information **1-4**

6. Compliance information **1-5**

7. Equipment identification and labelling **1-5**

8. Abbreviations and definitions **1-5**

9. Manual history **1-5**

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

1. Purpose of the manual

This documentation is valid for BuckyDiagnost TH2 / TF.

The table BuckyDiagnost TH2 / TF is part of the BuckyDiagnost family and can be installed together with the ceiling suspension BuckyDiagnost CS, respectively the floor stand BuckyDiagnost FS and the X-ray generator OPTIMUS RAD / OPTIMUS 30 single phase.

The table BuckyDiagnost TH2 is characterized by:

- height-adjustable tablebase
- floating tabletop

The table BuckyDiagnost TF characterized by:

- fixed height tablebase
- floating tabletop

2. Items supplied

BuckyDiagnost TH2

- Table with floating tabletop, 750 mm x 2400 mm, Kevlar
- Height sensor
- Manual bucky unit, non-sensing
- Grid for bucky unit
- AMPLIMAT chamber

Options:

- Manual bucky unit with format sensing
- Automatic cassette loader (ACL4)
- Tomo 2 device
- Footswitch locking device
- Second table control
- Wider table top 850 mm x 2400 mm
- Shorter table top 750 mm x 2000 mm

BuckyDiagnost TF

- Table with floating tabletop, 750 mm x 2400 mm, Kevlar
- Manual bucky unit, non-sensing
- Grid for bucky unit
- AMPLIMAT chamber

Options:

- Manual bucky unit with format sensing
- Automatic cassette loader (ACL4)
- Tomo 2 device
- Wider tabletop 850 mm x 2400 mm
- Shorter tabletop 750 mm x 2000 mm

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

3. Compatibility

- Bucky unit non format sensing	9848 500 2030x
- Bucky unit with format sensing	9804 609 6030x
- Bucky unit with format sensing	9848 500 2040x
- Automatic cassette loader (ACL4)	9848 600 0202x
- Tabletop standard	9890 010 0219x
- Tabletop Aramid	9890 010 0220x
- Tomo 2 device BuckyDiagnost TH	9848 600 0256x
- System control BuckyDiagnost	9848 500 2270x
- Height sensor for BuckyDiagnost TH	9848 500 2260x
- Grid 36/8 FO 100	9860 834 9010x
- Grid 36/8 FO 110	9896 010 2608x
- Grid 36/8 FO 140	9896 010 2609x
- Grid 36/12 FO 100	9860 836 9010x
- Grid 36/12 FO 110	9896 010 2600x
- Grid 36/12 FO 140	9896 010 2607x
- Grid 36/12 FO 180	9896 010 2604x
- Grid 40/12 FO 100	9860 846 9010x
- Grid 40/12 FO 110	9860 846 9011x
- Amplimat chamber	9890 000 0161x
- BuckyDiagnost CS	9890 xxx xxxxx
- BuckyDiagnost FS	9890 xxx xxxxx

Options:

- Footswitch locking device	9890 010 02712
- Second table control	9890 010 02731

Accessories:

- Adjustable head clamp	9804 662 33009
- Pair of handgrips	9804 662 43009
- Ratchet compressor	9804 666 22009
- Symm. ratchet compressor	9804 666 22109
- Lateral cassette holder	9804 666 32009
- Cassette holder, hor. beam	9804 668 10009
- Pair of leg supports	9804 668 50009
- Infusion bottle holder	9804 669 10009
- Pair adj. positioners	9804 669 20009
- Parking frame for accessories	9804 669 30009

Upgrades:

- Upgrade f. bucky brake TH	9890 010 02881
- Upgrade sec. table contr. TH	9890 010 02901
- Upgrade footswitch look	9890 010 02912
- Upgrade kit tracking	9890 010 80191
- Upgrade kit high load	9890 010 81251
- Upgrade kit key switch for bucky TH	4512 130 82901

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

4. Technical data

4.1. Mechanical data

- Mechanical dimensions BuckyDiagnost TH2 / TF see 2Z-1.1 and 2Z-1.2

4.2. Environmental data

	Operation	**Stock / Transport**
Temperature in °**Celcius**	10 / + 40	- 25 / + 70
Temperature in °**Celcius** / **Hour**	N / A	N / A
Humidity in % (non-condensing)	20 / 80	5 / 95
Gradient in % / **hour**	N / A	N / A
Vibrations / Shock range in **Hz**	5 - 500	5 - 500
Vibrations / Shock amplitude in **mm**	N / A	N / A
Vibrations / Shock acceleration in **g**	0.25 peak	1.0 peak
Shock acceleration in **g**	5 peak	30 peak
Shock pulse duration in **msec**	11	11
Air pressure in **Hecto-pascal**	700 / 1100	700 / 1100

Acoustic noise level : N / A
Air cooling : N / A
EMC : IEC 950

4.3. Electrical data

Equipment related:

Power required : max. 900 VA
Nominal voltages : 230 VAC
Supply configurations : 230 VAC
Voltage variation : N/A
Voltage impulse : N/A
Voltage surge : N/A
Voltage sag : N/A
Static frequency variation : 50 or 60 Hz ± 1 Hz
Dynamic frequeny variation : N/A
Harmonic voltage distortion (single, total) : N/A
Neutral to ground voltage variation : N/A
Neutral to ground volate impulse : N/A
Nominal current : 6.0 A / 0.6 A (TH2 / TF)
Nominal frequency : 50 Hz / 60 Hz

Heat emission
standby : N/A
in operation : N/A

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

4.4. Tools / Material required

Pre-installation

Delivered	:	N/A
To be ordered	:	N/A
To be arranged locally	:	- TC 129, Tool kit, standard - Power tools (hammer drill with 12 mm carbide drill bits)

Installation

Delivered	:	Set of standard fixing material Wooden table transport bars
To be ordered	:	N/A
To be arranged locally	:	- TC 129, Tool kit, standard - Spirit level - TC 092, Notebook, service PC - TC 003, Service PC cable kit - TC 091, Multimeter - Service software X-Scope 1.4.2 or higher - Power tools (hammer drill with 12 mm carbid drill bits) - Measuring tape, 10 m

4.5. Network data

N/A

4.6. Remote service data

N/A

4.7. Transport data

For information about transport data refer to the corresponding PRD.

4.8. Pre-installation requirements

- Room layout (floor fixing) (Refer to PRD)

The preliminary planning work is restricted to the selection of a suitable room. The outfit of the room has to be equipped with the conduits and pipes required and, in cases where the loading capacity of the bearing area (380 kg on 2 x ≅ 500 cm^2) is insufficient, the floor preparation for the table.

Where DIN specification are not applicable the minimum wall clearances should be determined in compliance with the concerning national regulations.

4.9. Movements

- Table height (see 2Z-1.1 and 2Z-1.2)
- Tabletop (see 2Z-1.1 and 2Z-1.2)

4.10. Pre-installation data

For information about the pre-installation data refer to PRD 'Product planning' BuckyDiagnost TH2 / TF.

5. Safety information

N/A

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

6. Compliance information

N/A

7. Equipment identification and labelling

N/A

8. Abbreviations and definitions

Abbreviation	Explanation
CS	Ceiling Suspension
FS	Floor Stand
MSB	Mini System Bus
PMS	Philips Medical Systems
POST	Power-On Self Test
PRD	Product Reference Data
SID	Source Image Distance
TC	Tool Code
TF	Table Fix
TH	Table Height adjustable
VE	Vertical
VR	Vertical Radiography
VT	Vertical Tiltable

9. Manual history

Date	Version	Name	Reason of changes
01.02.2005	V1 REV AA	M. Bierstedt	Introduction of TH2 (MSB)

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

Installation

Contents **2-0.1**

1. Unpack, transport, mount **2-1**

1.1. Box dimensions 2-1

1.2. Unpack 2-2

2. Floor fixation of BuckyDiagnost TH2/TF **2-3**

3. Height adjustment for installation (TH2) **2-3**

4. Alignment for BuckyDiagnost TH2 /TF **2-3**

5. Change position of the AMPLIMAT chamber from left to right side **2-4**

6. Electrical connection **2-5**

6.1. Connection location at the BuckyDiagnost TH2 / TF 2-5

7. Installation of the table covers **2-6**

8. Installation of the tabletop for BuckyDiagnost TH2/TF **2-7**

9. Installation of the table end covers **2-8**

10. Final work **2-8**

10.1. Final work for BuckyDiagnost TH2 2-8

10.2. Final work for BuckyDiagnost TF 2-9

11. Labels **2-9**

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

1. Unpack, transport, mount

1.1. Box dimensions

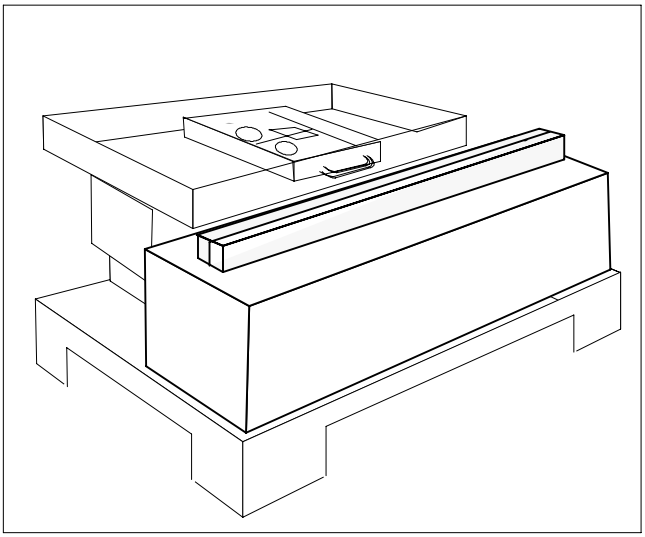
Crate / Box Tablebase TH2	**Dimension (mm)**			**Weight (Newton)** (10 N = 1 kg)
	Length	Width	Height	
Packed	1350	950	1000	2500
Installed	Refer to mechanical dimension drawings			2040

Crate / Box Tablebase TH2 incl. tomo	**Dimension (mm)**			**Weight (Newton)** (10 N = 1 kg)
	Length	Width	Height	
Packed	1350	950	1000	2620
Installed	Refer to mechanical dimension drawings			2160

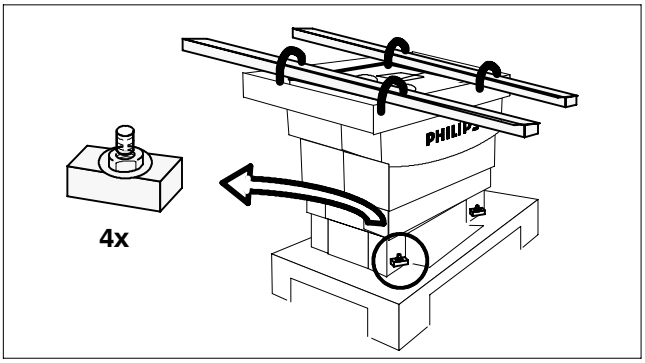
Crate / Box Tablebase TF	**Dimension (mm)**			**Weight (Newton)** (10 N = 1 kg)
	Length	Width	Height	
Packed	1360	980	1120	max.1740
Installed	Refer to mechanical dimension drawings			max. 1300

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

1.2. Unpack



- Remove the boxes and the wooden bars from the pallet. The boxes include the table covers.



- Loosen the nuts **4x** of the screwings at the front and rear side.
  - Remove the nuts.
  - Remove the washers.
  - Remove the fixing blocks.

- Insert the wooden bars into the loops.
- Lift up the table base with four persons and remove it from the pallet.

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

2. Floor fixation of BuckyDiagnost TH2/TF

Determine the working position of the table.

Note
Refer to PRD room layout or local planning data and use the drilling template from the System Manual Installation.

- Mark the four fixing points at the floor.
- Drill ∅12 mm holes in the middle of the marked area about 100 mm deep.
- Insert the four anchor dowels in the holes.
- Fix the anchor dowels.
- Lift the table and place it in its working position.

3. Height adjustment for installation (TH2)

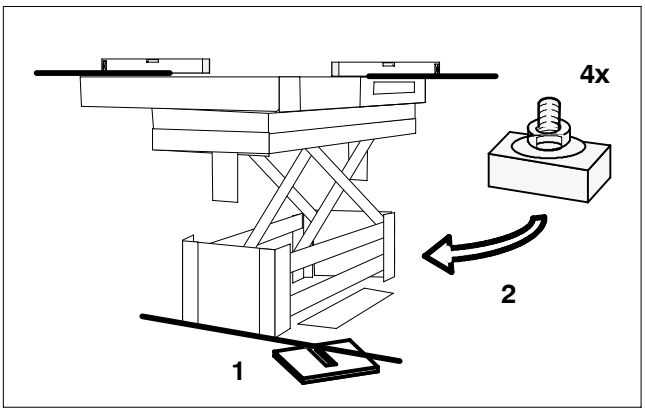
- Connect cable **MEX** from table to the mains of 220 VAC to move the table upwards into a better working position.
  Also connect the protection lead (green/yellow).
- Press foot switch to move the table upwards.
- Press foot switch to move the table downwards.

Warning!
If the table does not move downwards, press on the tabletop with 20 kp. Do not adjust the collision switch! The table automatically stops at the middle position.

- Disconnect **MEX** from mains.

4. Alignment for BuckyDiagnost TH2 /TF

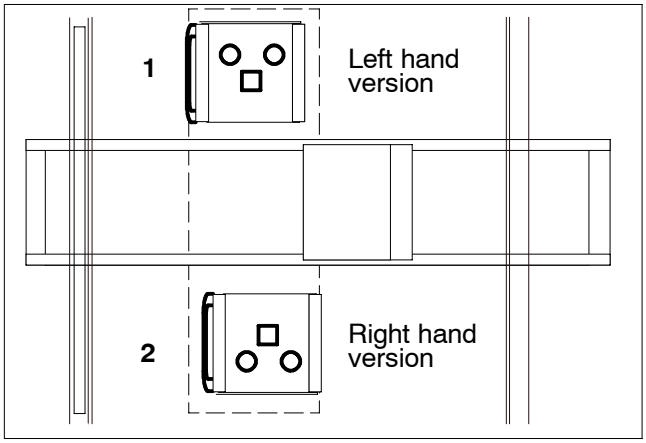
- Level the table in both directions by using a spirit level or by using the laser alignment tool, use the spacer, if necessary (**1**).
- Insert the fixing block (**2, 4x**), the special washer and fasten the nut with a spanner.



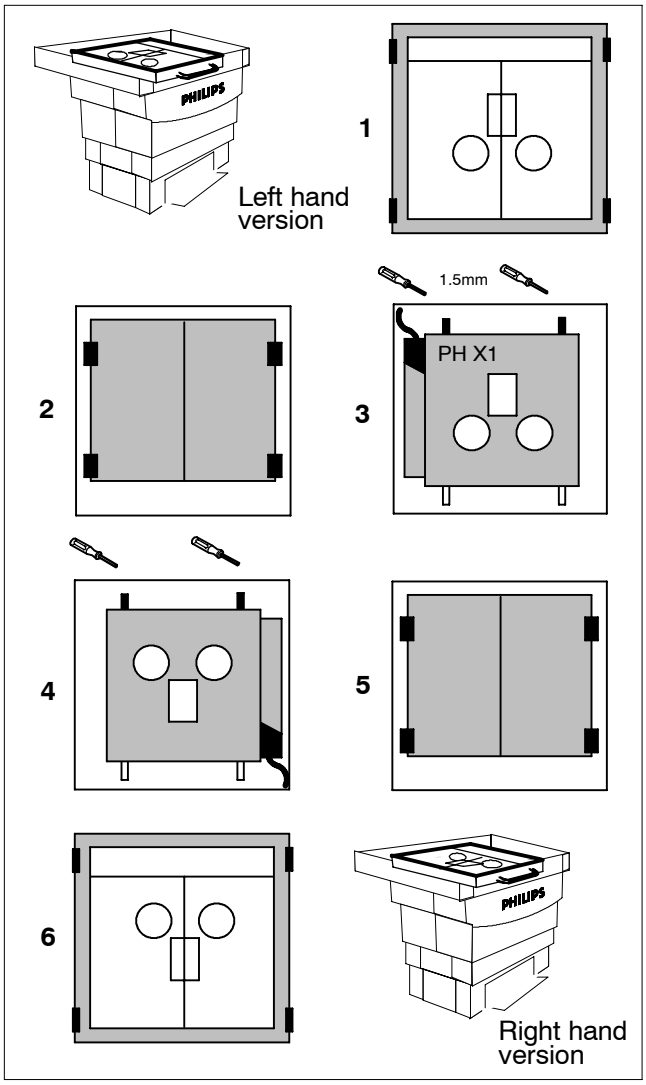
© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

5. Change position of the AMPLIMAT chamber from left to right side

A manipulation of the connector at the AMPLIMAT chamber is necessary, if the position of the BuckyDiagnost TH2 / TF must be changed from left (**1**) to right (**2**) side.



- Remove the tabletop by removing the four screws (**1**).
- Mark the center line of the tabletop to the frame (both sides).
- Remove the tabletop.
- Dismantle the anti-scatter grid by unscrewing the four metal holders (**2**).
- Remove the anti-scatter grid.
- Dismantle the AMPLIMAT chamber by loosening the two grub screws (**3**).
- The wire assignment on the connector **PH X1** must be interchanged, the violett wire on **X1:1** with the black wire on **X1:3**.
- Place the measuring chamber at the new position (**4**).
- Tighten the measuring chamber with the two grub screws.
- Re-install the anti-scatter grid (**5**).
- Tighten the anti-scatter grid.
- Re-install the table cover at the new position (**6**).
- Tighten the table cover.



© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

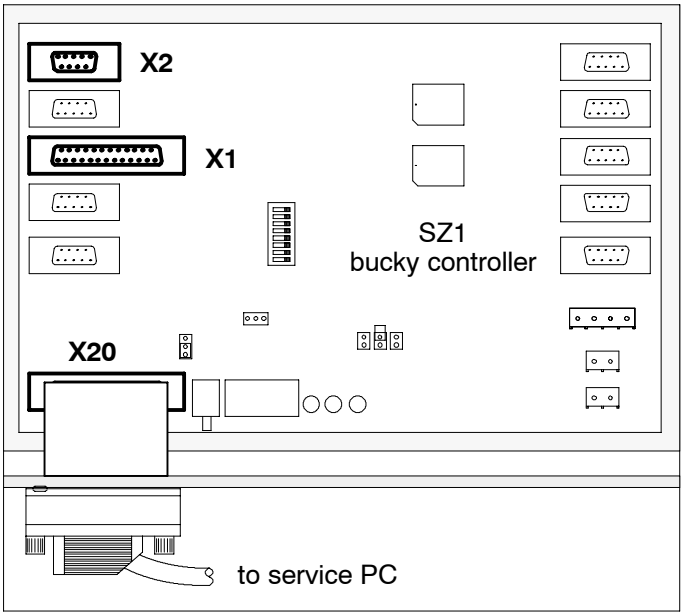
6. Electrical connection

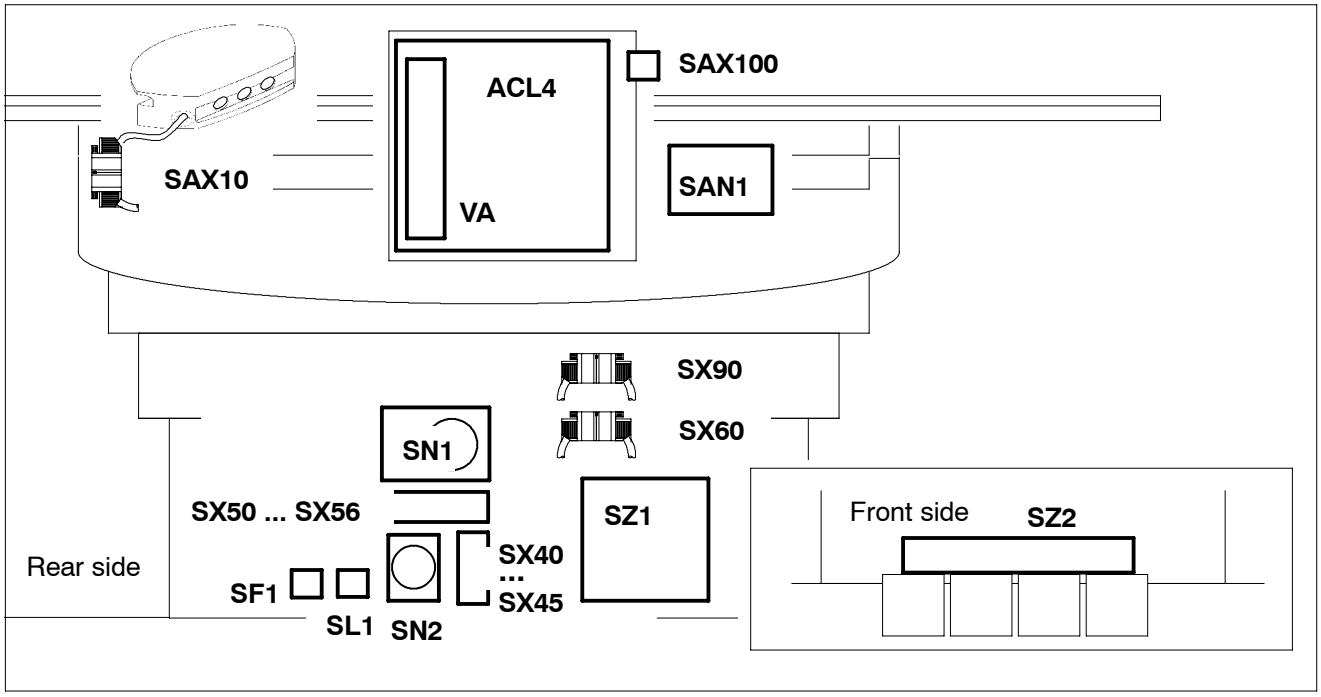
The BuckyDiagnost TH2/TF is supplied with sets of cables including plugs connected at one side.

- Install the cables and connect them as specified in the corresponding SMI, Section 8, 'Cabling and earthing', connection diagrams.

6.1. Connection location at the BuckyDiagnost TH2 / TF (MSB)

Power supply 230 VAC	**SX50 ... SX56**
Power supply 24 ... 30 VDC	**SX40 ... SX45**
Power supply TH	**SN1**
Power supply ACL4	**SN3**
Bucky controller	**SZ1**
CAN bus	**SZ1X2**
Signal bus	**SZ1X1**
Connection to PC (X-Scope)	**X20**
Amplimat to generator	**SX60**
Tomo CAN bus	**SX90**
Second table control, option	**SAX10**
Bucky brake, option	**SAX100**
Motor amplifier board	**SZ2**
Tomo drive and control	**SAN1**

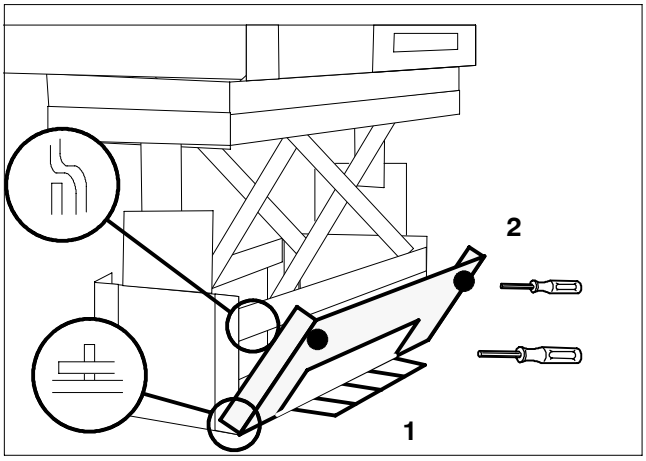




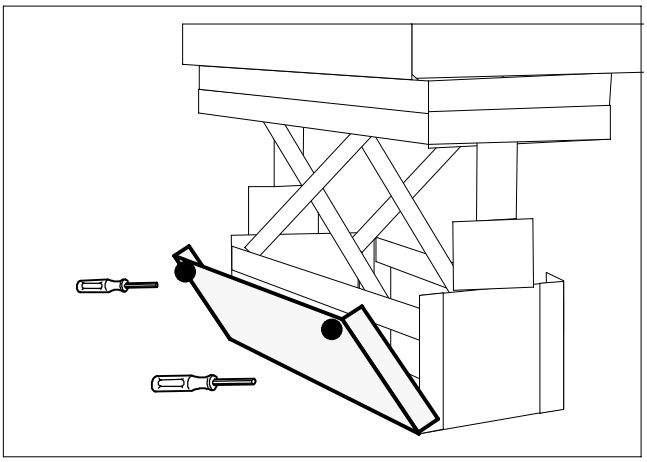
© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

7. Installation of the table covers

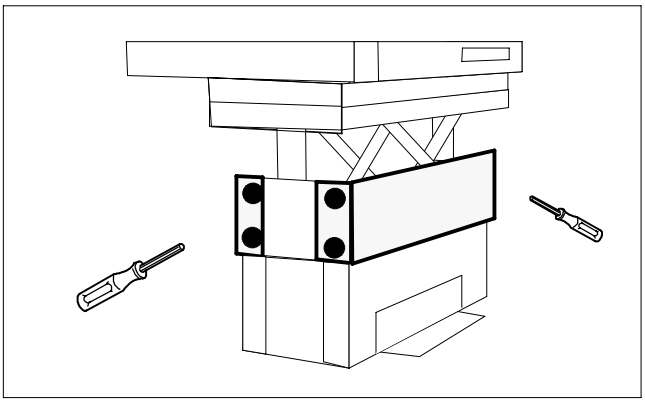
- Raise the table to its uppermost position (only TH2). Press foot switch to move the table upwards.
- Lift up the foot switch assembly (**1**).
- Fit the lower front cover (**2**) into pins and screw it on.
- Connect the earth wire **SX72**, **SX73** to the lower front cover.



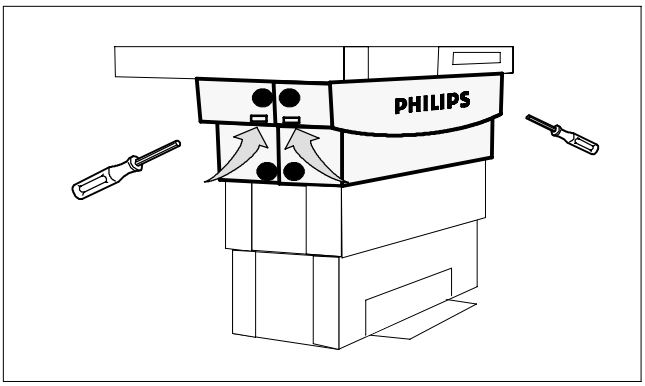
- Fit the lower rear cover in the pins and screw it on.
- Connect the earth wire **SX74** to the lower rear cover.



- Insert the middle side covers at both sides of the table.
- Install both middle covers at the front and rear side. The covers are identical.
- Insert the screws. Do not fasten the screws completely.



- Install the upper covers at the front and the rear side. The covers are identical. Do not fasten the screws completely.
- Adjust the covers.
- Fasten all screws.
- Move the table up and down and check whether the covers slide without any abrasion and noise (only TH2).



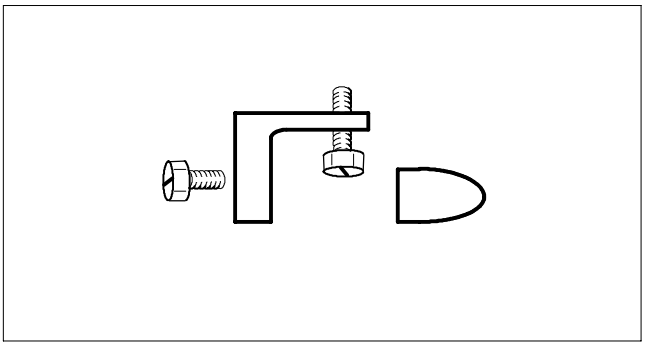
© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

8. Installation of the tabletop for BuckyDiagnost TH2/TF

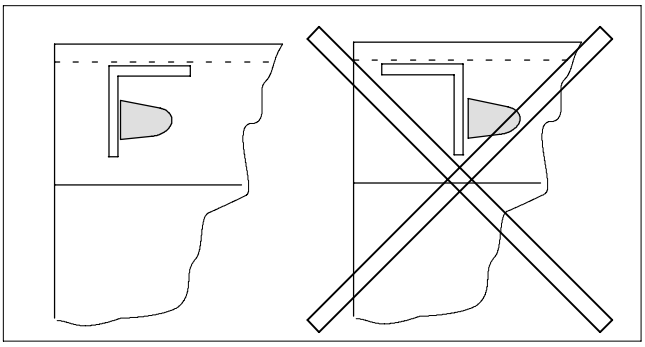
- Remove the tabletop from the transport box.
- Check whether the ball bearings are adjusted correctly to the tabletop. If not, remove the tabletop and adjust the eccentric bearings.

Installation of the end stops:

- Remove the parabolic buffer from the stop angle to install the stop assembly.



- Screw the stop angle to the table rail (respect the “right direction”).
- Screw the parabolic buffer to the stop angle.

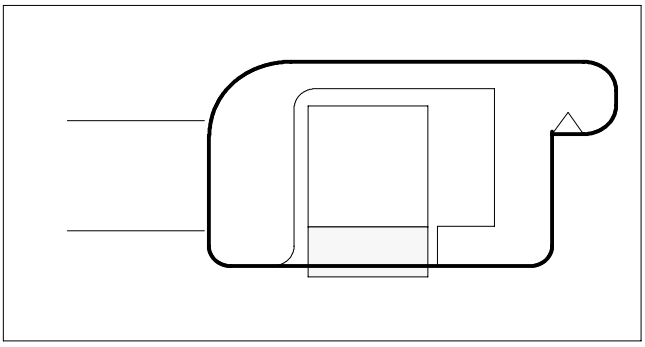


© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

9. Installation of the table end covers

The cover profile prevents injury by sharp edges.

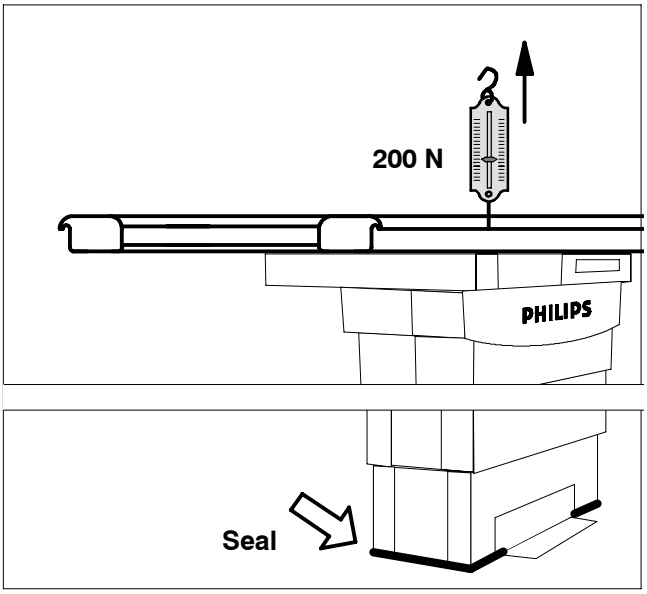
- Install (**4x**) new end covers to the four tabletop edges.
- Check the level of the table in both directions with a spirit level.
  - If necessary, use linings.



10. Final work

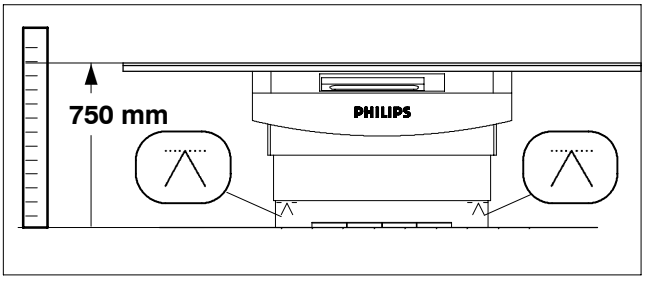
10.1. Final work for BuckyDiagnost TH2

- Check all table functions:
  - table movement upwards and downwards switched by the foot switches
  - table movement upwards and downwards switched by the second table control (optional)
  - function of longitudinal and transverse brakes.
- Check the collision switch.
- Move the tabletop downwards.
  Press foot switch to move the table downwards.



If the table does not move downwards press on the tabletop with 200 N.
Do not adjust the collision switch (SS10)!
This switch is factory adjusted.

- Seal the base of the table with silicon.
- Clean all covers with a mild cleaner like soapsuds.
- Move the table to the ”preferred table height position” (about 750 mm), the table stops automatically.
- Place the labels so that the dotted line is in line with lower edge of the mid cover.



© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

10.2. Final work for BuckyDiagnost TF

- Check the function of longitudinal and transverse brakes.
- Seal the base of the table with silicon.
- Clean all covers with a mild cleaner like soapsuds.

11. Labels

- Check the labeling (see 2Z-10).

■

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

FAULTFINDING

TEXT

Contents **3-0.1**
1. Faultfinding guide **3-1**
2. Power supply of BuckyDiagnost TH2 / TF with ACL4 and tomo **3-2**
2.1. Location of electrical Components 3-2
3. Power-ON sequence and stand-by **3-3**
3.1. BuckyDiagnost TH2/TF selftest 3-3
3.2. Tomo unit (option) selftest 3-4
4. Table movement of BuckyDiagnost TH2 ..... **3-5**
4.1. Table switches 3-5
4.3. Collision switch 3-6
5. Tabletop movement **3-7**
5.1. Floating table 3-7
5.2. Table carriage brakes 3-7
6. Height sensing **3-8**
6.1. Table height sensor 3-8

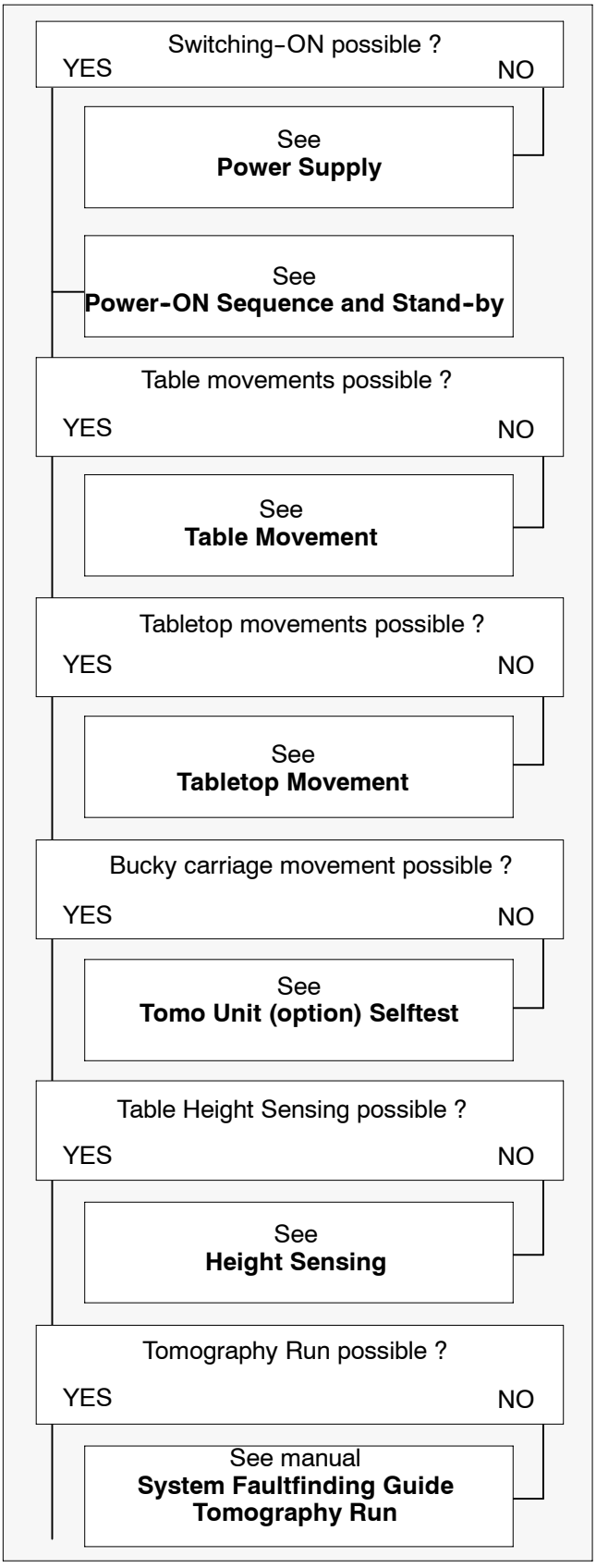
© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

1. Faultfinding guide

Convention

Switch is closed = **ON**
Switch is open = **OFF**

LED / lamp illuminated = **ON**
LED / lamp not illuminated = **OFF**



© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

2. Power supply of BuckyDiagnost TH2 / TF with ACL4 and tomo

Mains power of 220 VAC for

table via F1, L1 to X50 ...X56

table lift motor **SNV**

PCB power supply **SN1** for
table control **SZ2**

bucky carriage, magnetic brake **VAC**

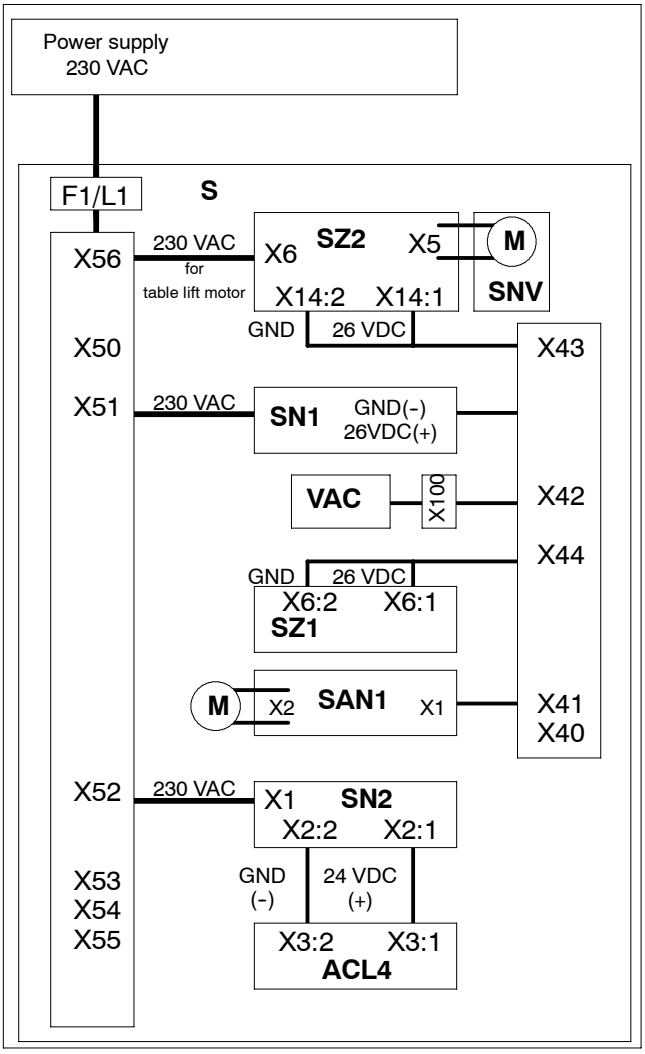
bucky controller **SZ1**

table tomo drive & control **SAN1**

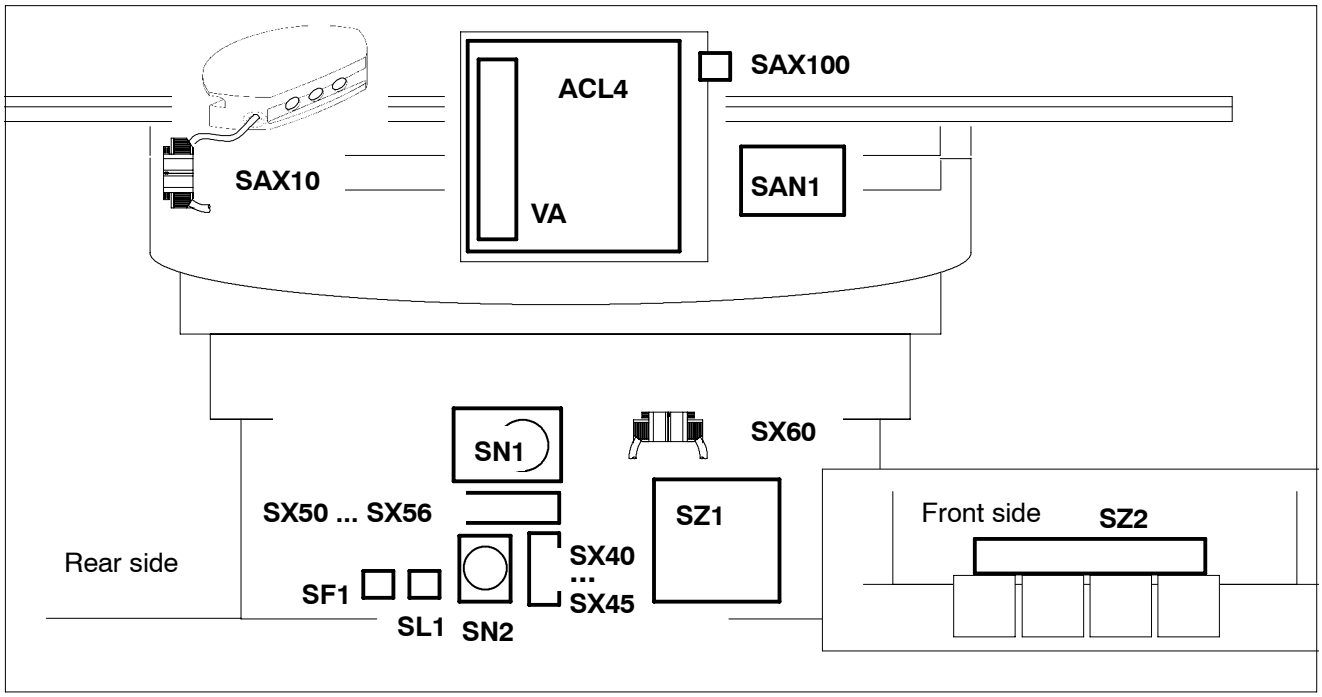
ACL4

PCB power supply for **SN2** for

automatic cassette loader **ACL4**



2.1. Location of electrical components



© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

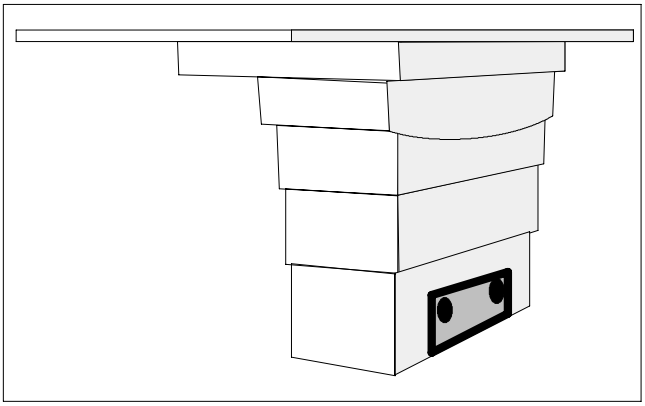
3. Power-ON sequence and stand-by

The BuckyDiagnost system runs through a selftest after power–ON.

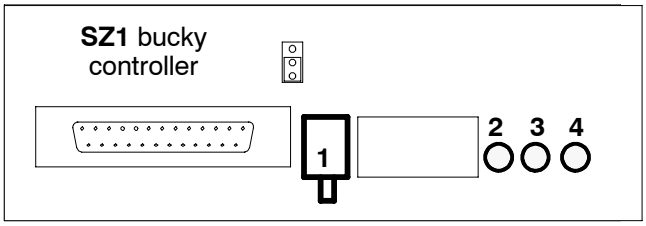
- Switch **ON** the system.

3.1. BuckyDiagnost TH2/TF selftest

- Raise the table to its uppermost position. Press foot switch to move the table upwards. The table stops automatically (only TH2).
- Unscrew the service cover at the rear side, open it for inspection.



- Press reset switch (**1**) to re-start the bucky controller.



The red LED (**2**) (= bucky controller is not ready) is illuminated until the selftest is ended successful.
The yellow LED (**3**) (= CAN bus is working) flashes after successful selftest.
The green LED (**4**) (= bucky controller is ready) is illuminated after successful selftest.

- If the board **SZ1** fails, replace it. Configure the new board via program X-Scope.

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

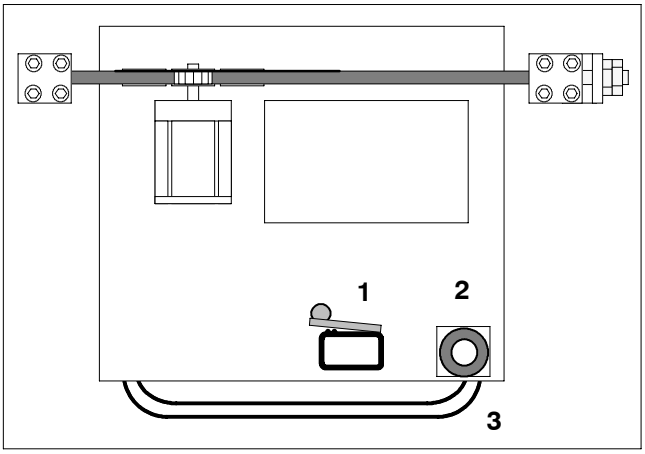
3.2. Tomo unit (option) selftest

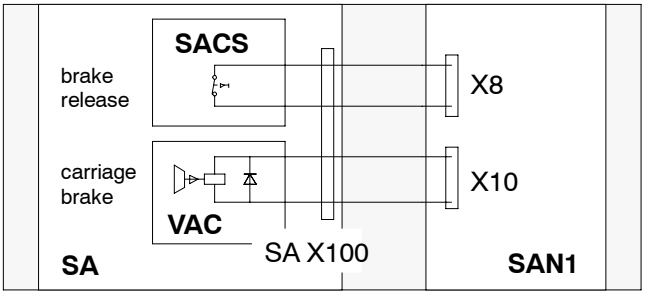
During the initialization phase the bucky carriage moves to its tomo center position. Afterwards the bucky carriage moves to one side then to the other side and stops in the middle position.

If the tomo unit selftest fails:

- Check brake release switch (**1**) and magnetic brake (**2**) on the bucky carriage.

The brake release switch is currently closed and is mechanically opened via the grip (**3**).



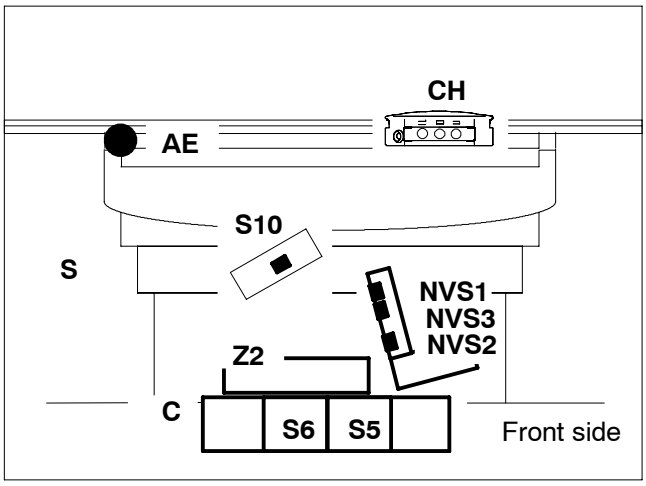


© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

4. Table movement of BuckyDiagnost TH2

4.1. Table switches

- Check the function of the footswitch lock **S AE**. Pressed switch = footswitches without function.
- Move the tabletop into the working position via footswitches **SC S6, S5** or via the optional second table control **SCH**.

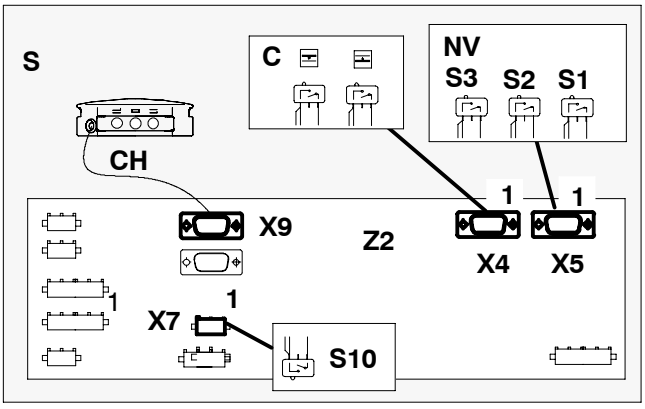


If the tabletop does not move upwards

- Check closed 900 mm switch **SNVS1** at **SZ2 X5:6**/**7** (24VDC) via 750 mm switch **SNVS3** at **SZ2 X5:3**/**4**.
- Check footswitch **S5** for upwards movement at **SZ2 X4**.
- Check optional handswitch **SCH** for upwards movement at **SZ2 X9**.

If the tabletop does not move downwards

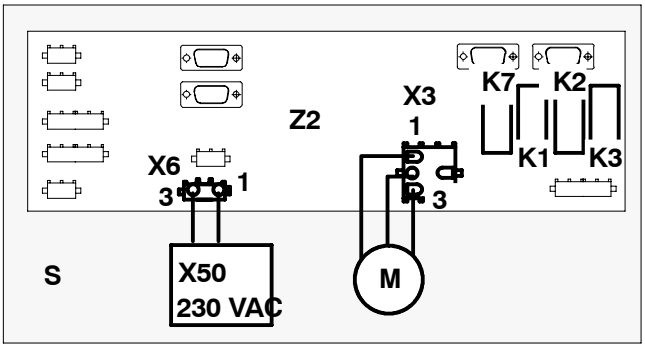
- Check closed safety switch **SS10** at **SZ2 X7:2**/**1** (24 VDC) via closed 500 mm switch **SNVS2** at **SZ2 X5:8**/**9** via 750 mm switch **SNVS3** at **SZ2 X5:3**/**4**.
- Check footswitch **S6** for downwards movement at **SZ2 X4**.
- Check optional handswitch **SCH** for downwards movement at **SZ2 X9**.



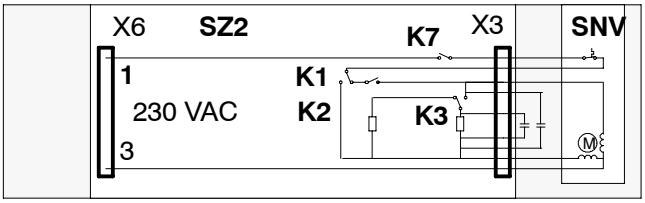
If the tabletop does not move upwards or downwards

- Check the relay **K1** or **K2** on board **SZ2**. One of the two relays must be activated by pressing either the footswitch or the optional handswitch.

The relay contact supplies the voltage of **230 VAC** to the motor **SNV** via **SZ2 X3:1**/**:2**/**:3**.

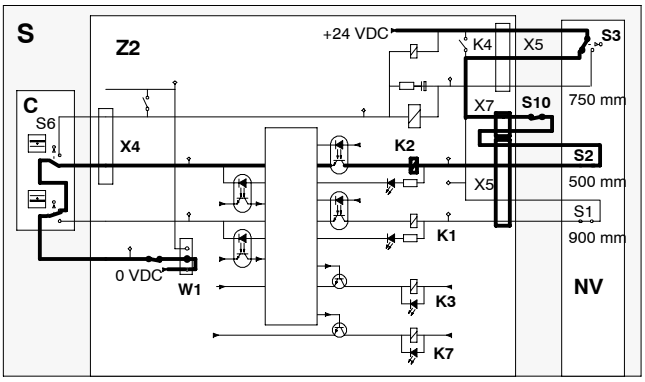


K1 Table upwards relay
K2 Table downwards relay
K3 Start-up relay for starting capacitor. Relay is activated over 1 s only in the upwards starting phase.



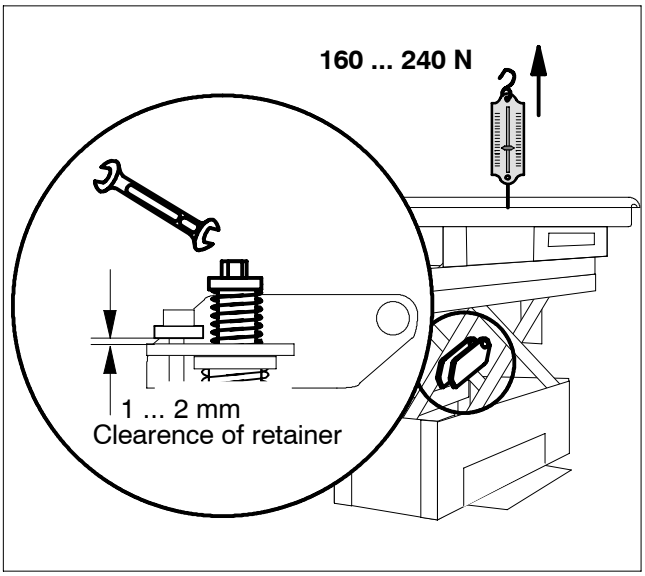
© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

During movement the tabletop stops in the middle position of the table height via the 750 mm switch **SNV S3** on the table lift motor.



- See also drawing 4Z-2.

4.2. Collision switch

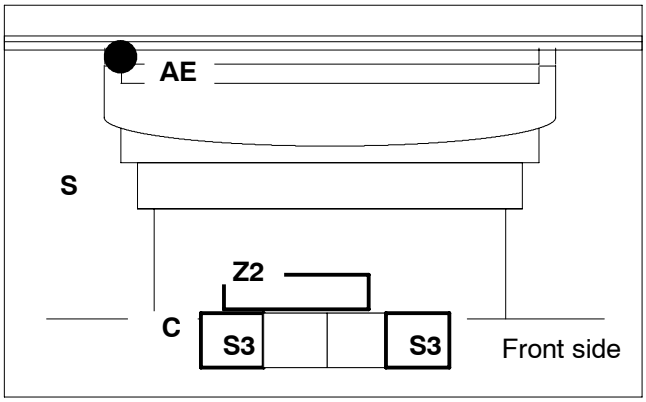


- Check the force of the table movement.
  - Pull up the tabletop with a spring balance. The safety switch **SS10** must open if a force of 160 ... 240 N is reached. Otherwise:
  - Adjust the spring tension at the tension screw with a 13 mm spanner
    clockwise = force of collision decreases
    counterclockwise = force of collision increases

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

5. Tabletop movement

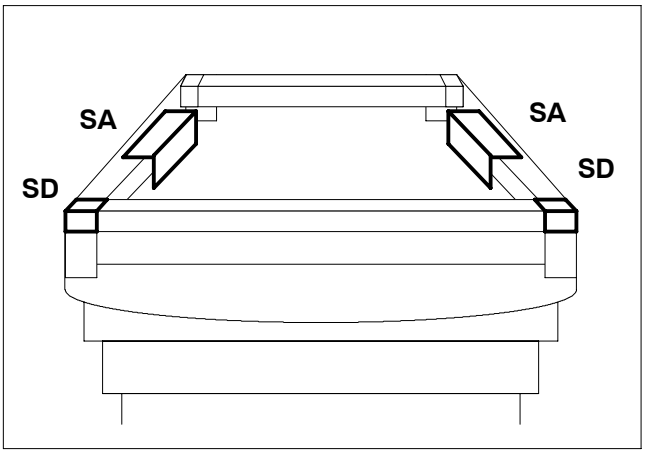
5.1. Floating table



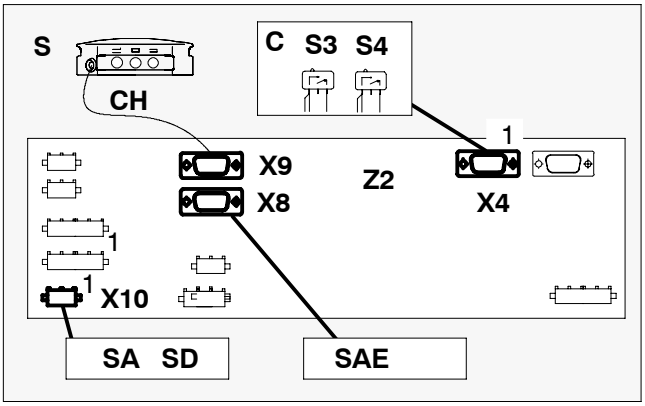
- Press the footswitch **SC S3**. The tabletop must be floatable. If not, check items:
  - footswitch lock **S AE**
    (must not be active = pressed)
  - brakes for longitudinal and transverse direction
  - footswitch for tabletop floating
- Use the second table control to check functions as described above, if possible.

5.2. Table carriage brakes

- Check the function of the brakes.



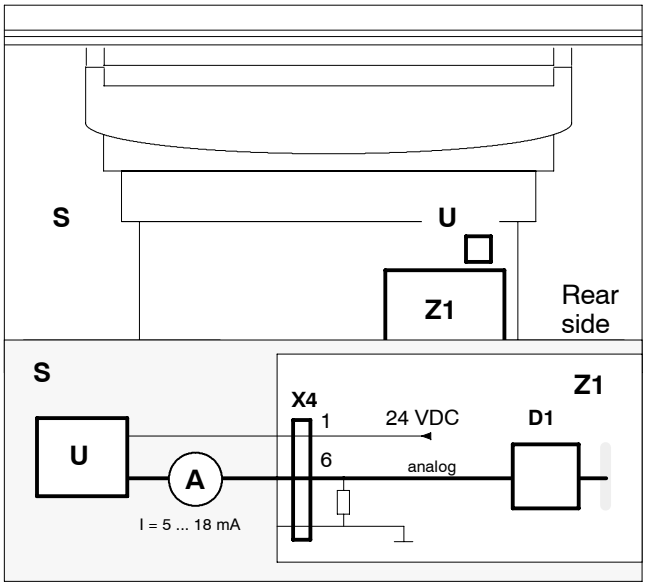
- Check the connection to **SZ2 X10**. Voltage of +24 V is delivered via the footswitch **S3** or via the optional second table control switch.
  If the footswitches are locked via the footswitch lock, functions of tabletop movements via the optional second table control are always possible.



© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

6. Height sensing

6.1. Table height sensor



- See also drawing Z1-3.

The height sensor operates as a current source.
The range of the current value is 5 mA (table is in lowest position) up to 18 mA (table is in uppermost position).

The current value can be shown :

- Connect a service PC to **SZ1 X20**.
- Call up program VT100 for monitoring.
- Type in:↲
  - `superuser`↲
  - `set service output_errors_to_vt100 1`↲

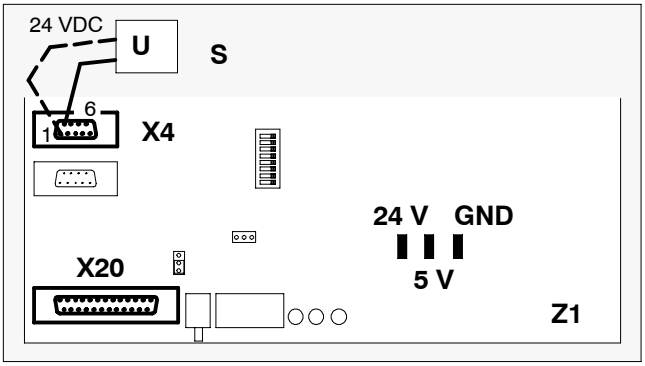
Every action is shown on the PC screen, also the current depending on the topical table height.

- `show analogue`↲

The analogue inputs is displayed on the PC screen.

- `show service sid`↲

The SID parameters are displayed on the PC screen.



- Check the height sensor **SU** at **SZ1 X4**, measure the current**.**
  - If I = 0 mA,
    check the voltage at **X4:1** or find the reason in the cable.
  - If I = 20 mA,
    check the cable or replace the height sensor.

■

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

REPLACEMENTS

Contents **4-0.1**

1. Replacement of the table lift motor at BuckyDiagnost TH2 ..... **4-1**

1.1. Manpower 4-1

1.2. Replacement 4-1

1.3. Final work 4-1

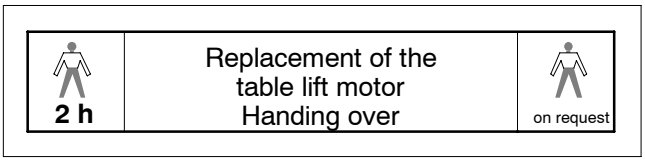
2. Replacement of the height sensor **4-2**

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

1. Replacement of the table lift motor at BuckyDiagnost TH2

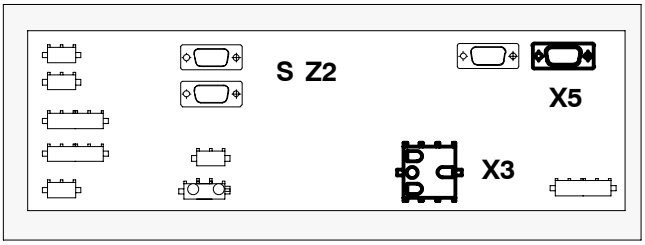
1.1. Manpower

1 service engineer, approximately 2 hours.
A second person must be present on request (e.g. to insert the safety rod).



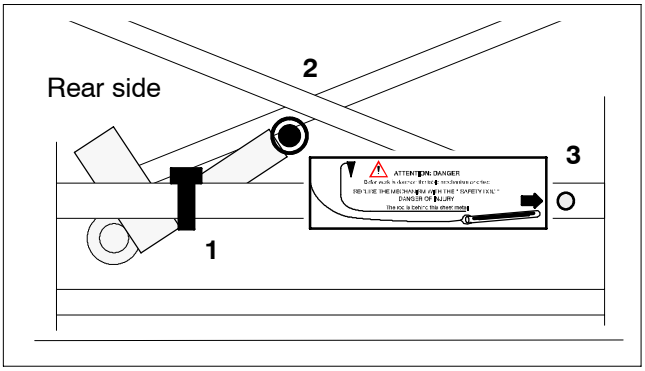
1.2. Replacement

- Switch OFF the system.
- Remove the table covers.
- Disconnect the motor unit from the table controller board **SZ2** on **X3** and **X5**.

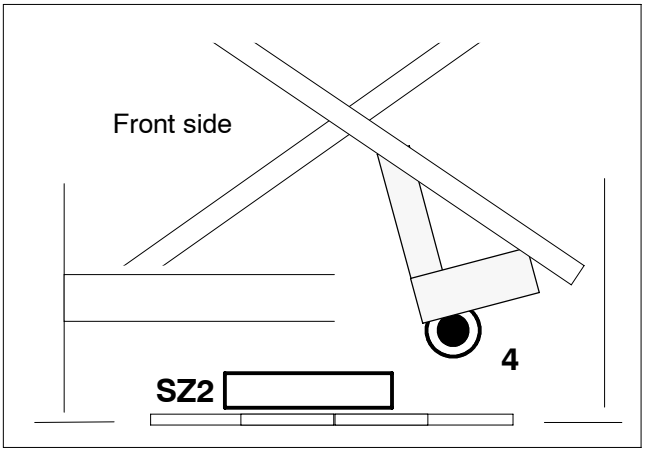


If the table is in the lowest position:

- Screw the bolt (**1**) against the frame and lift the frame about 1 cm so that access to the cylindrical pin (**2**) is possible.
- Remove the retaining ring on the pin (**2**).
- Remove the cylindrical pin.
- Lift up the table assembly to insert the safety rod through the holes (**3**) at the rear side and the front side.
  (The safety rod is placed near the safety label on the frame.)



- Remove the retaining ring on the cylindrical pin (**4**).
- Remove the cylindrical pin.
- Replace the table lift motor.
- Re-assemble the table.
- Park the safety rod.



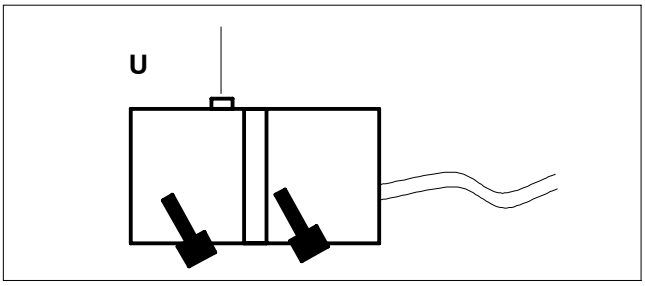
1.3. Final work

- Test all movements of the table.

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

2. Replacement of the height sensor

- Raise the bucky tabletop to its uppermost position.
- Loosen the two screws on the housing.
- Replace the height sensor unit.
- Assemble in reverse order.



■

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

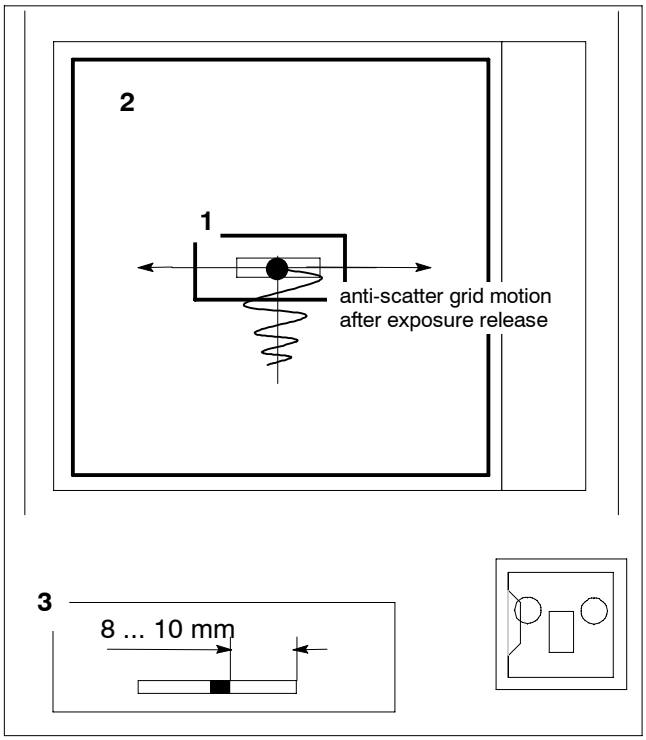
ADJUSTMENTS

Contents **6-0.1**
1. Delay time check by test exposures **6-1**
1.1. Cassette loader INALFA 6-1
1.2. Cassette loader ACL4 6-1
2. Tomography (option) **6-2**
2.1. Adjustment of tomo force 6-2
2.2. Tomo exposure 6-2

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

1. Delay time check by test exposures

To adjust the exposure delay time preparatory work is necessary.



- Remove the tabletop to have free access to the anti-scatter grid of the bucky table .
- Check the delay time with a test exposure.
  - Lay the lead plate (**1**) on the grid (**2**), fix it with a piece of adhesive tape.
  - Make two exposures (see table) on the same film.
    The exposure shows a spot and a bar (**3**).

Exposure	Exposure time [sec]	[kV]	[mA]	Focus [mm]
1	0.5	60	15	0.6
2	0.02	125	25	0.6

- Measure the distance as shown in (**3**).

1.1. Cassette loader INALFA

- See manual of INALFA.

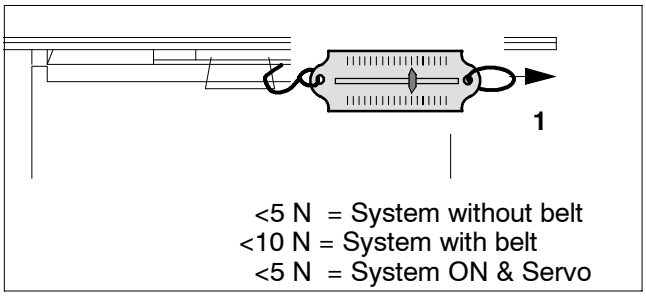
1.2. Cassette loader ACL4

- See manual of ACL4.

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

2. Tomography (option)

2.1. Adjustment of tomo force

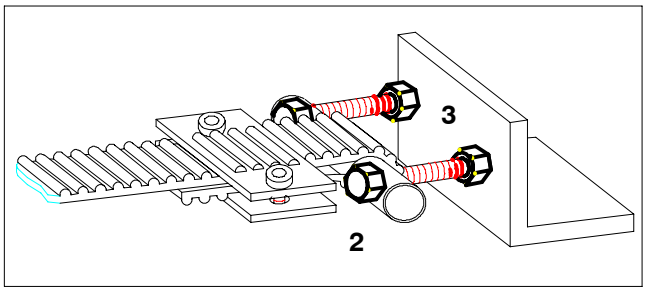


- Move the tabletop to its height center position.

If the tomography function is established, the bucky unit centers itself after power-ON.

- Switch OFF the system.
- Insert a spring scale in the handle (**1**).
  - Pull with the spring balance.
    The value of force is <10 N.

- Switch ON the system.
- Insert a spring scale in the handle (**1**).
  - Pull with the spring balance.
    The value of force is <5 N for a system with servo.

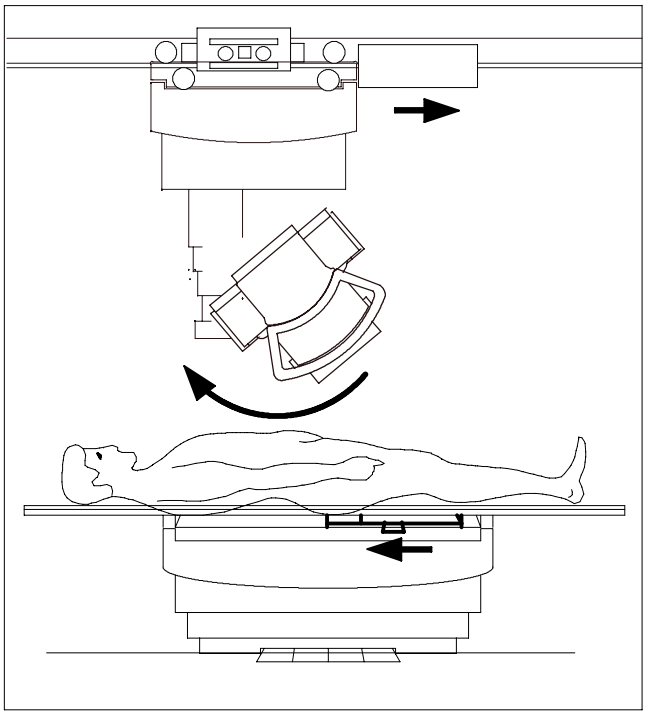


As necessary, loosen or tighten the belt via both screws (**2**) by loosening the nut (**3**) after removing the tabletop.

- Check the tomo force as described above.

If the belt oscillates it must be tensioned.

The tray servo assistance can be defined, see documentation of program X-Scope, Tomography configuration, 'Tray servo assistance'.



2.2. Tomo exposure

For programming tomo run direction see manual X-Scope.

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

Drawings

BuckyDiagnost TH2, Mechanical dimensions	Z-1.1
BuckyDiagnost TF, Mechanical dimensions	Z-1.2
Labelling	2Z-10

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

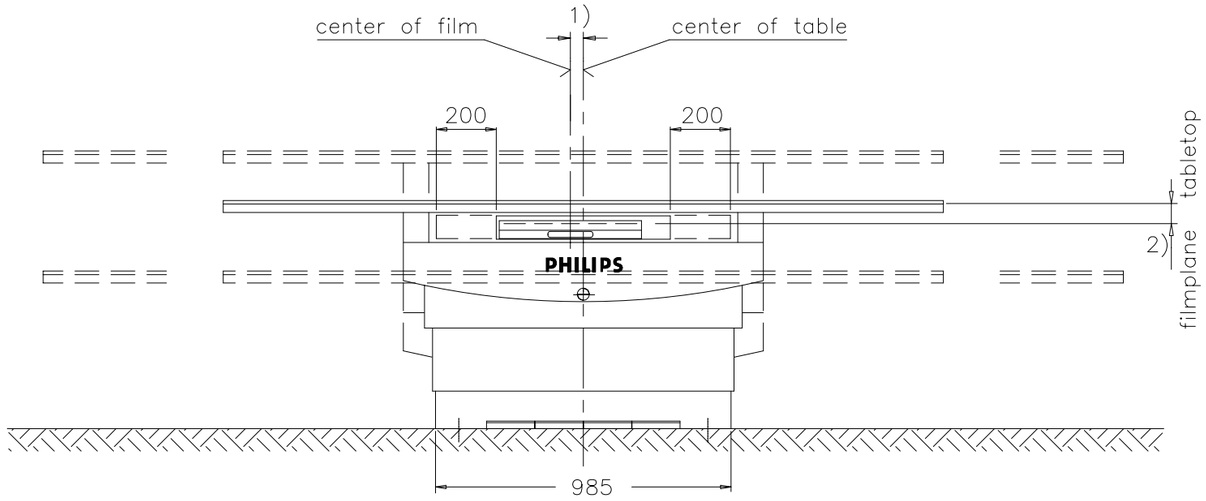


table top 750mm

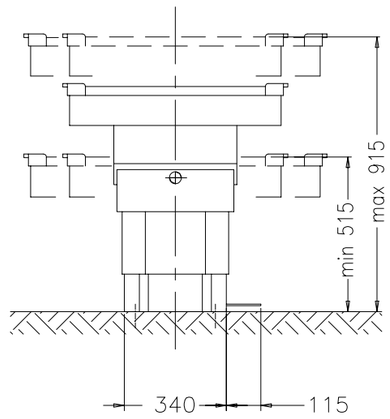


table top wide 850mm

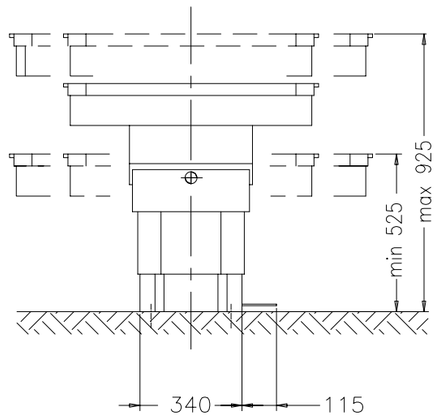


table top 2.0m (2.4m) x 0.75m

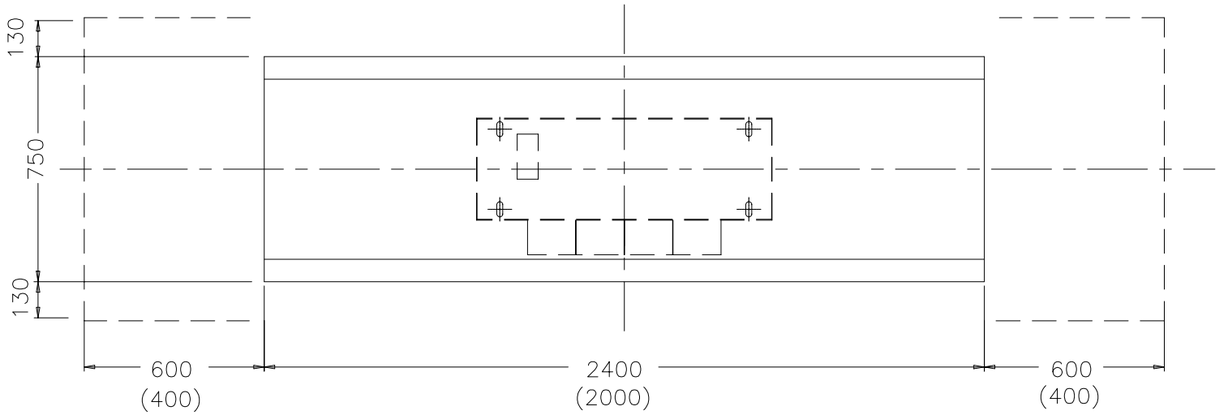
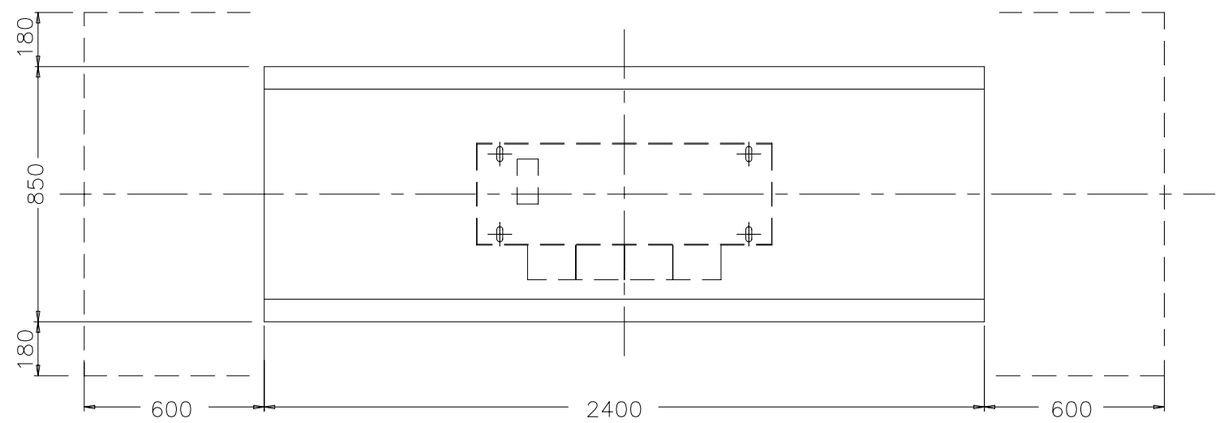


table top wide 2.4m x 0.85m

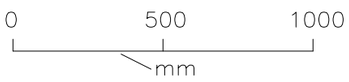


1)

Manual bucky tray INALFA	Center of film +43 mm = center of folder
Automatic bucky tray ACL4	Center of film = center of table

2)

	750	850
Manual bucky tray INALFA	67mm	77mm
Automatic bucky tray ACL4	71mm	81mm



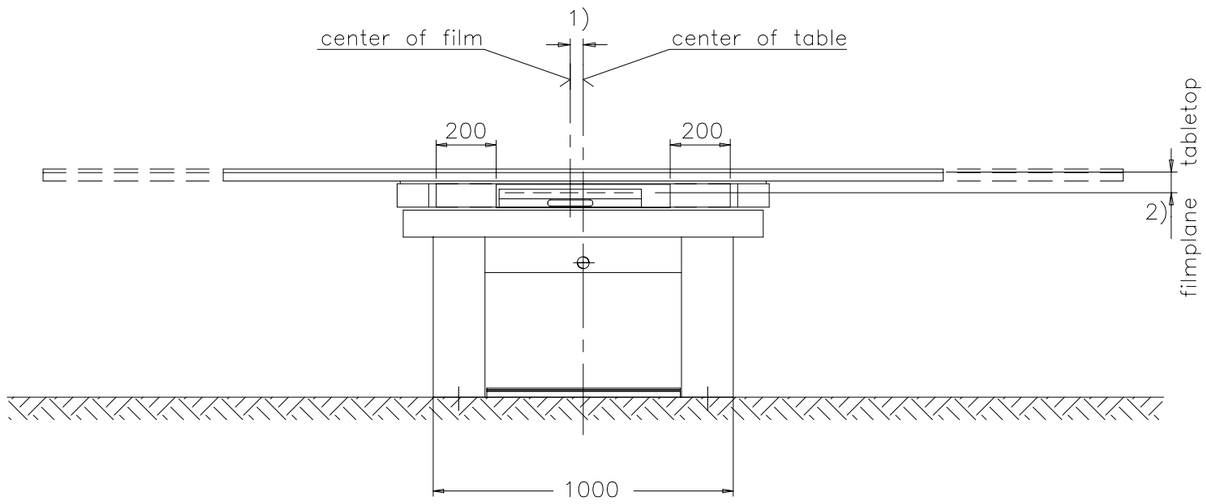
BuckyDiagnost TH2
Mechanical dimensions

Z-1.1

Product Planning Data

A3 04-11-12 Schr./Ost.
451298200963_z1_1_040

4512 982 0096. (04.0)
© Koninklijke Philips Electronics N.V.
All rights reserved



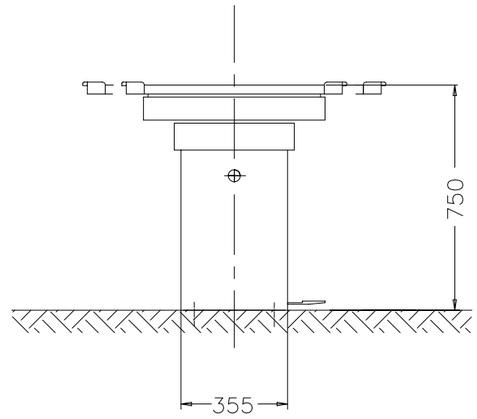
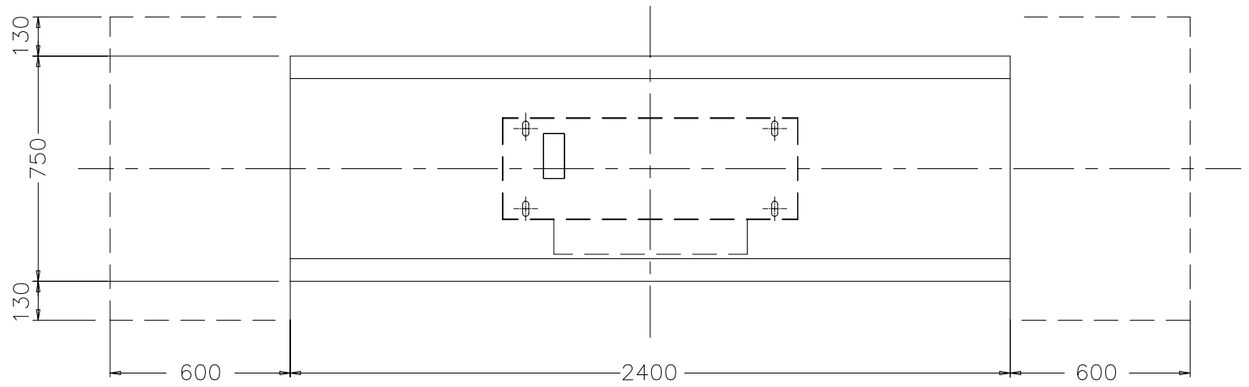


table top 2.40m x 0.75m



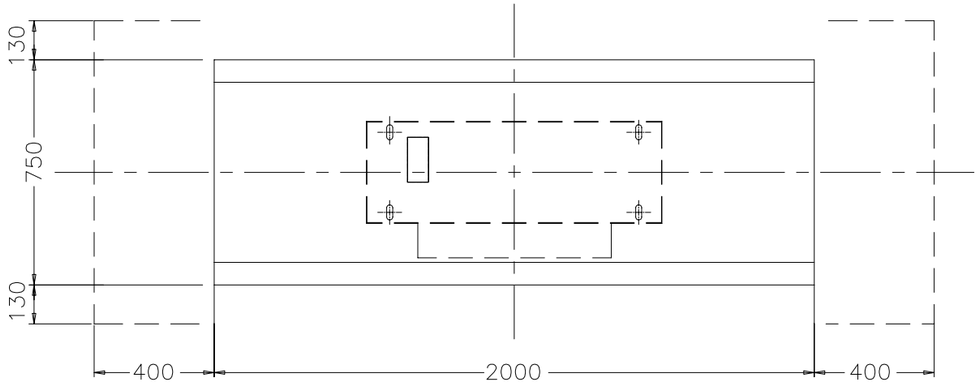
1)

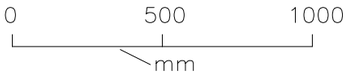
Manual bucky tray INALFA	Center of film +43 mm = center of folder
Automatic bucky tray ACL4	Center of film = center of table

2)

	750	850
Manual bucky tray INALFA	67mm	77mm
Automatic bucky tray ACL4	71mm	81mm

table top small 2.00m x 0.75m





BuckyDiagnost TF
Mechanical dimensions

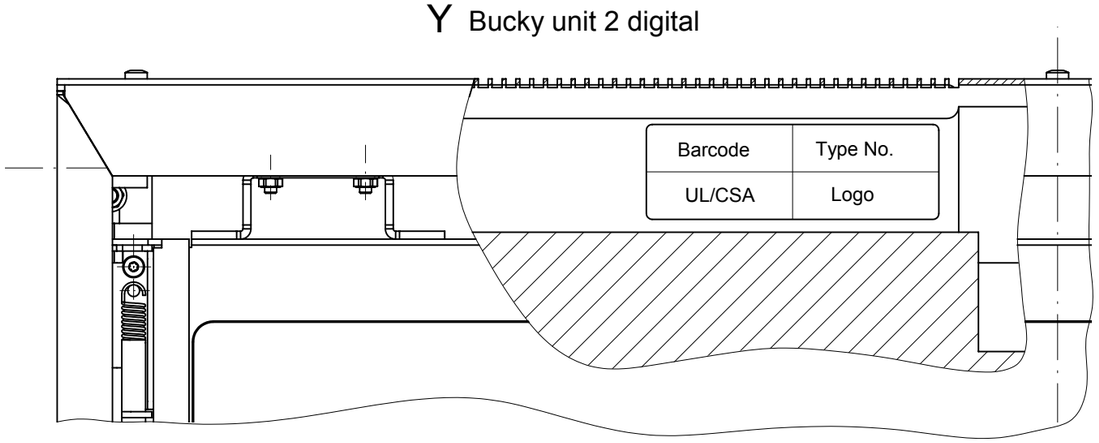
Z-1.2

Product Planning Data

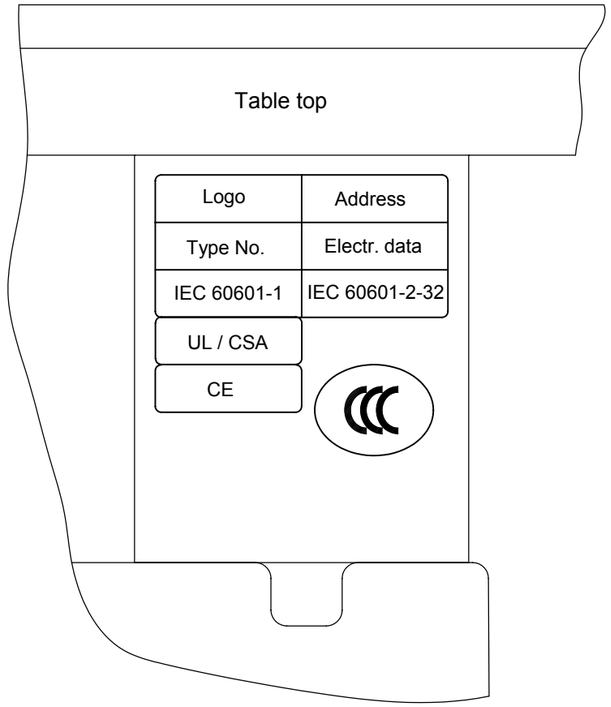
A3 04-11-12 Schr./Ost.
451298200963_z1_2_040

4512 982 0096. (04.0)
© Koninklijke Philips Electronics N.V.
All rights reserved

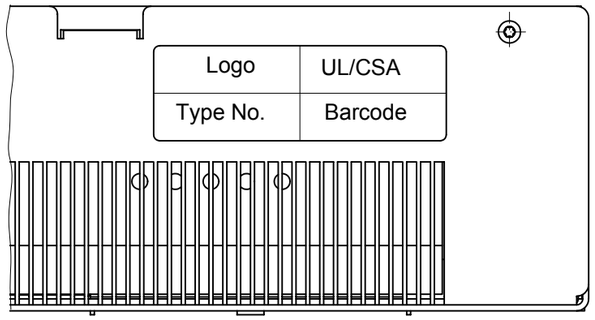
Y Bucky unit 2 digital



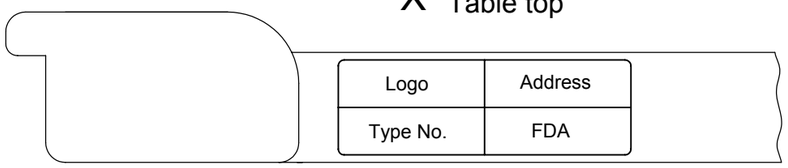
W Table height adjustable

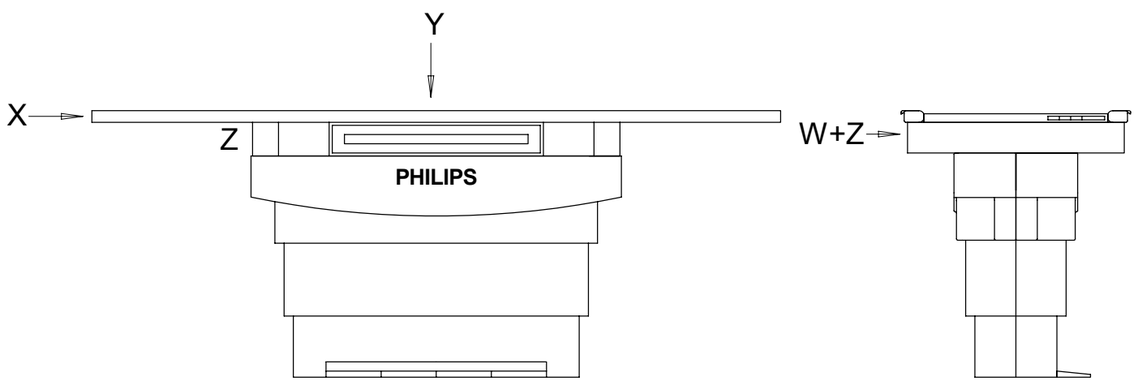


Z Bucky unit 2 digital



X Table top





A1/A3 04-10-05 Schr.

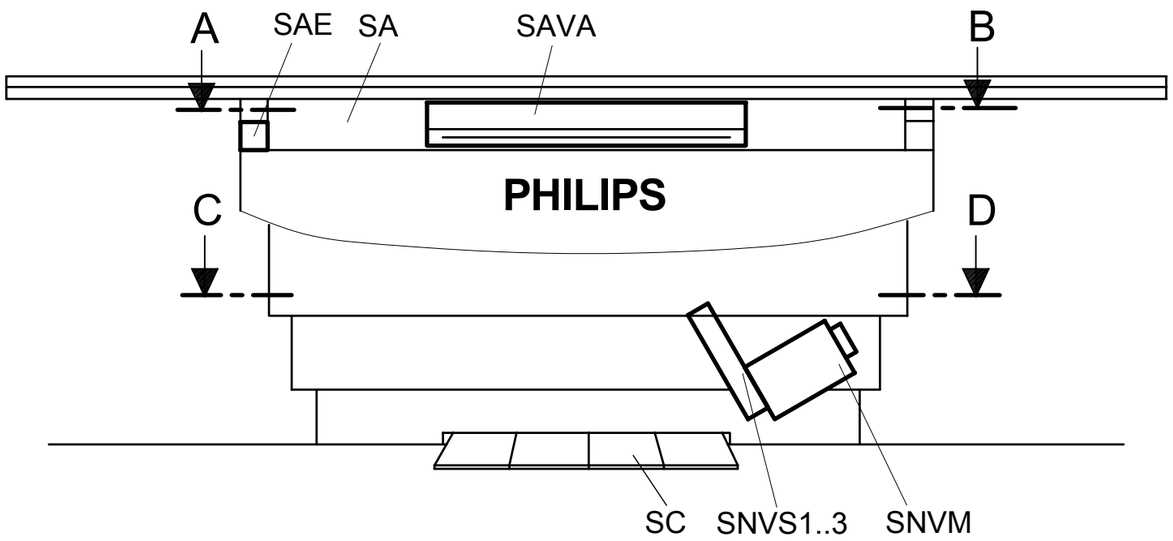
BuckyDiagnost TH (BUF)
Labelling

©Philips Medical Systems

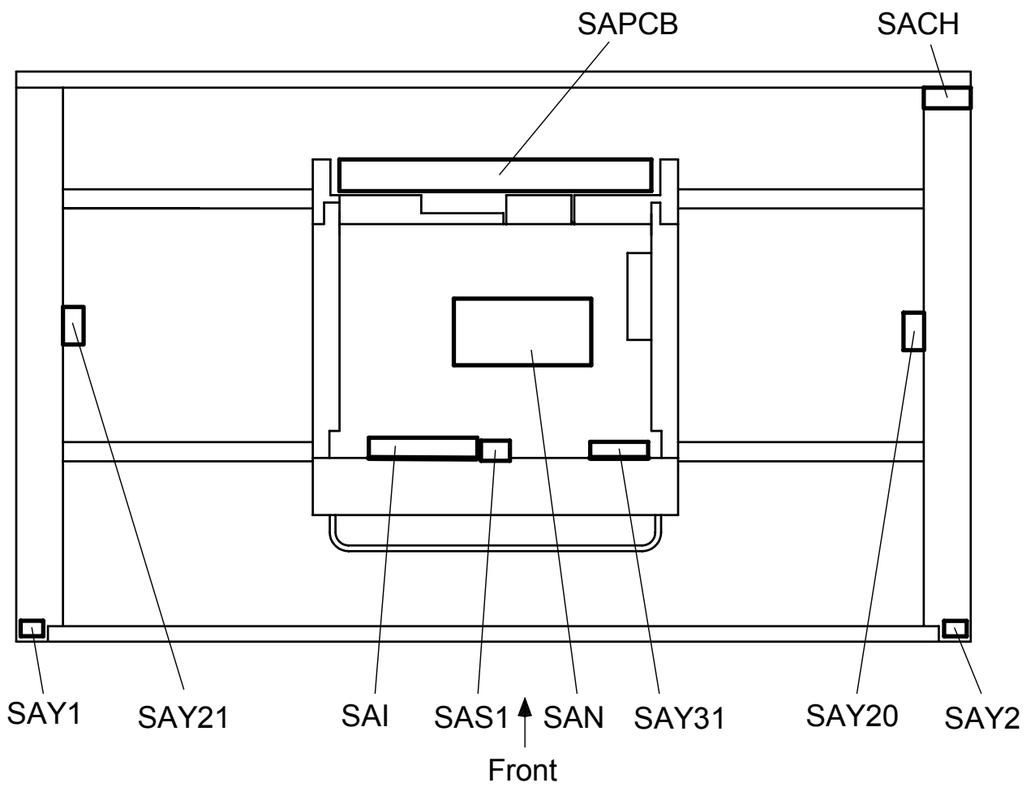
Schematic diagrams
Wiring diagrams

BuckyDiagnost TH2/TF MSB Survey of components	Z1-1
BuckyDiagnost TH2/TF (MSB) with Inalfa sensing Internal connection diagram	Z1-1.2
BuckyDiagnost TH2/TF (MSB) with ACL4 Internal connection diagram	Z1-1.3
BuckyDiagnost TH2/TF (MSB) with Inalfa non sensing Internal connection diagram	Z1-1.4
BuckyDiagnost TH2/TF (MSB) Power supply	Z1-2
BuckyDiagnost TH2/TF (MSB) Safety circuit and brakes	Z1-3
BuckyDiagnost TH2/TF (MSB) CAN and MSB bus	Z1-5
BuckyDiagnost TH2/TF (MSB) Wiring diagram	Z2-1
BuckyDiagnost TH2/TF (MSB) Earthing diagram	Z2-3
Tomo drive control survey of components	Z2-4
I IF main TH	Z3-1.1
I IF main TH	Z3-1.2
AI IF carriage	Z3-2.1
AI IF carriage	Z3-2.2
Z1 Bucky controller (4512 108 07508)	Z3-3.1
Z1 Bucky controller (4512 108 07508)	Z3-3.2
SZ1 Table control	Z3-4.1

© 2005 Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED



Top view A - B

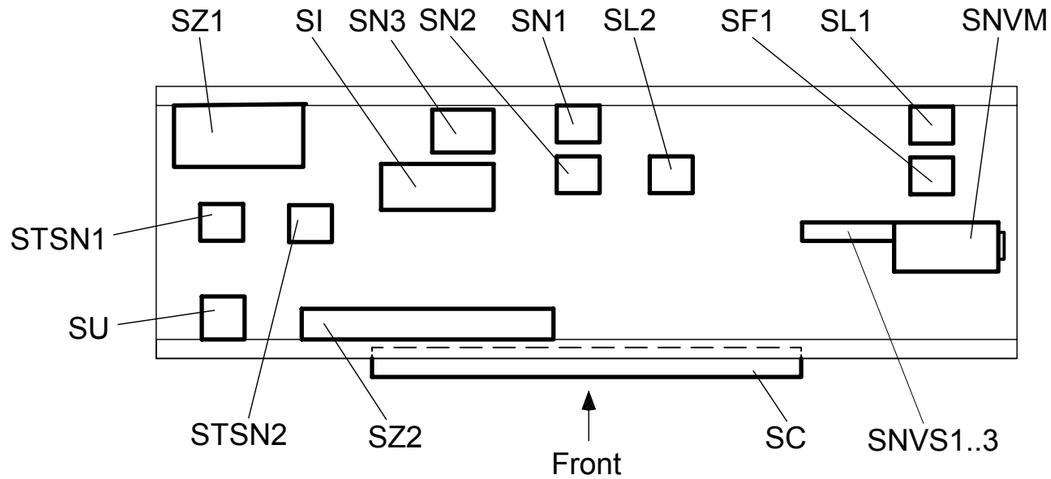


SA = Transverse carriage
SACH = Second table control (option)
SAE = Footswitch lock
SAI = IF Carriage board
SAN = Tomo control (option)
SAS1 = Switch Bucky frame brake
SAVA = Bucky unit
SAY1+2 = Logitudinal brakes
SAY20+21 = Transversal brakes
SAY31 = Bucky frame brake
SC = Footswitch
SF1 = Motor protection switch
SI = IF Main board TH
SL1 = Mains filter 1
SNVM = Table height motor
SNVS1...3 = Motor control switches
SN1 = Power supply 20,4VAC
SN3 = Power supply 24VAC (ACL4 only)
SU = Height Poti
SZ1 = Bucky controller
SZ2 = Table control

for DigitalDiagnost TH (BUF) only

SAPCB = Pixium control board
SL2 = Mains filter 2
SN2 = Power supply 24VDC
STSN1 = Power supply 9.26 V AC
STSN2 = Power supply 9.26 V AC

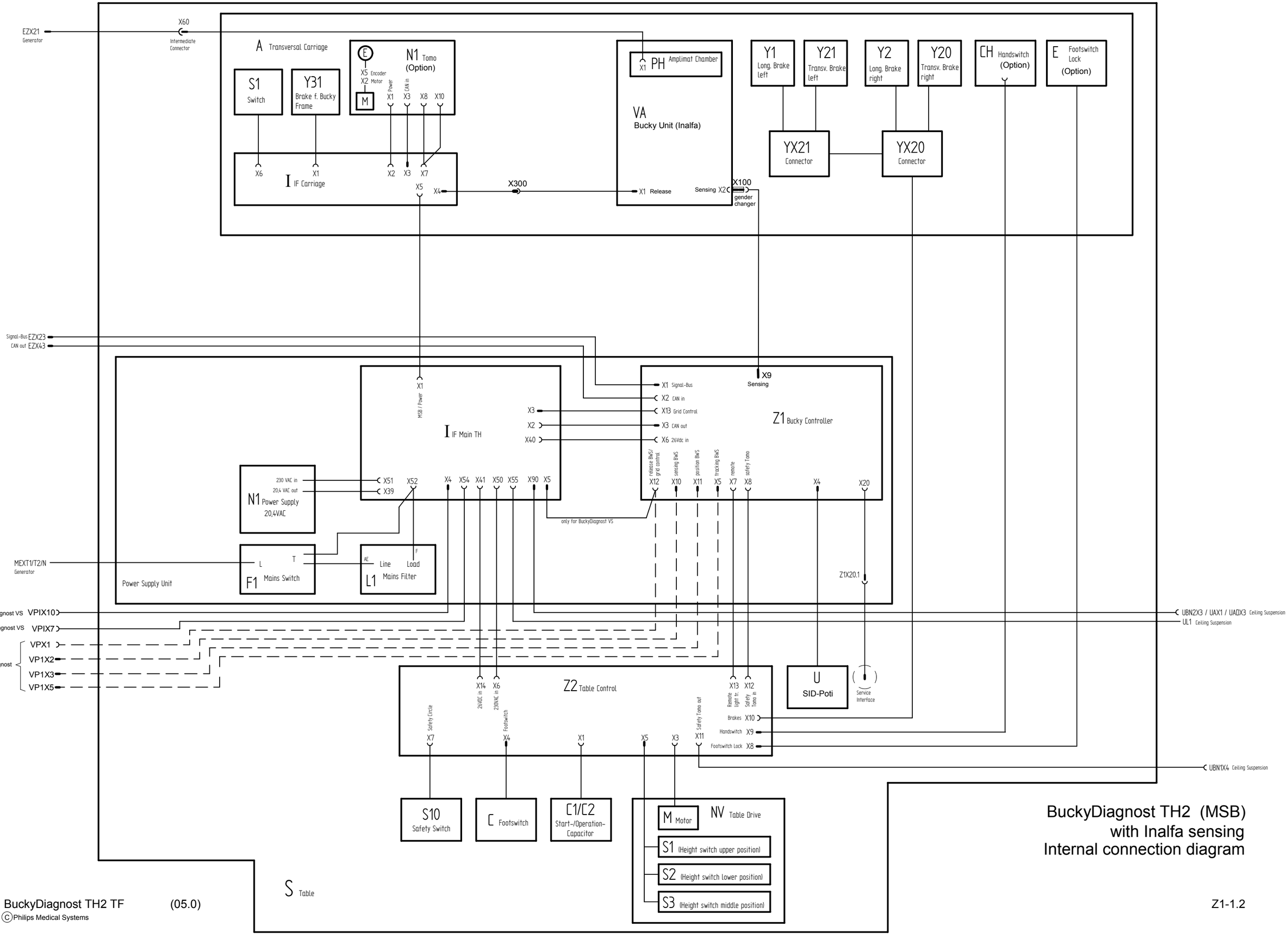
Top view C - D

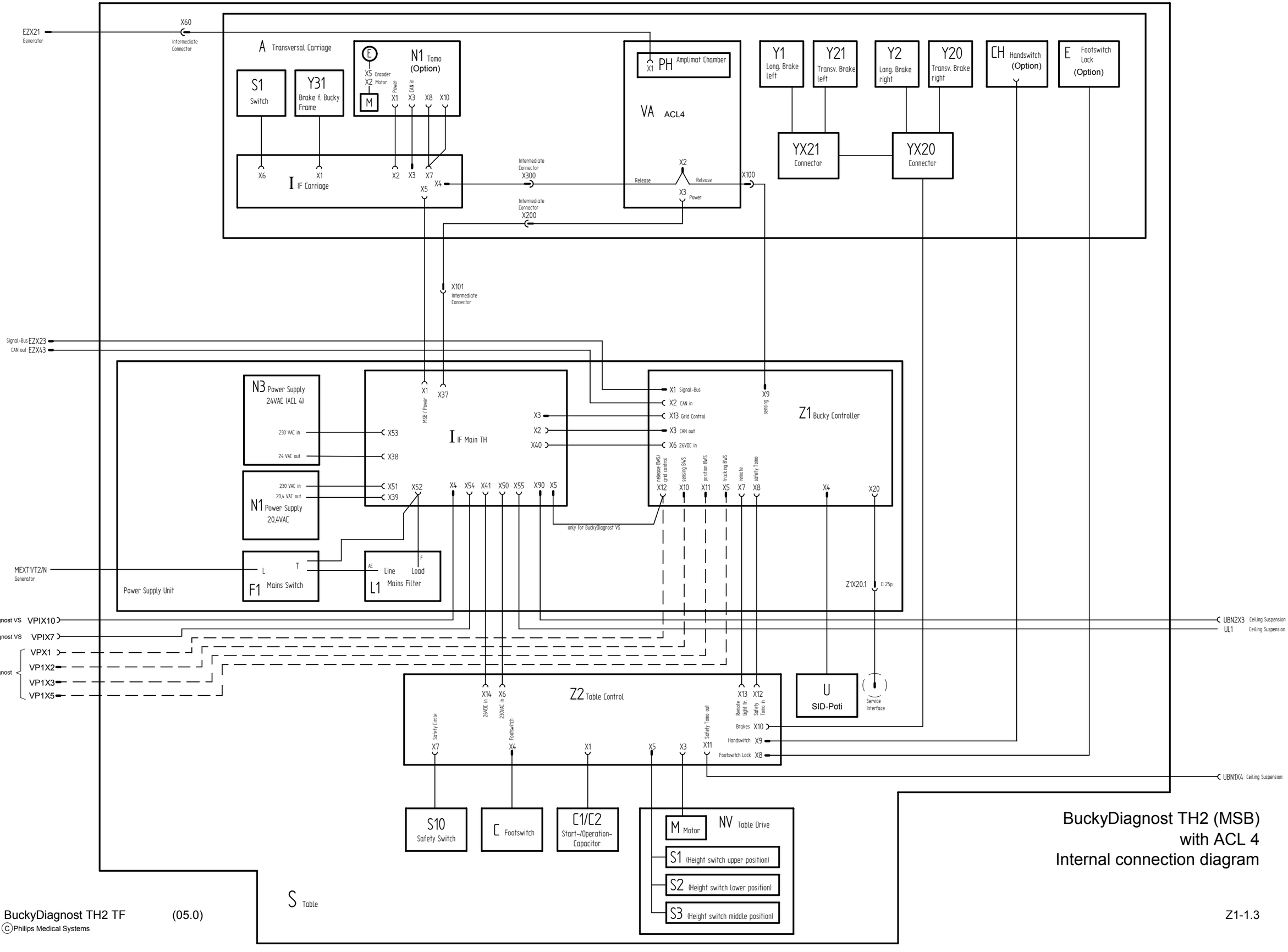


DigitalDiagnost TH (BUF)
BuckyDiagnost TH2 (MSB)
Survey of components

A3 05-01-25 Schr.

© Philips Medical Systems

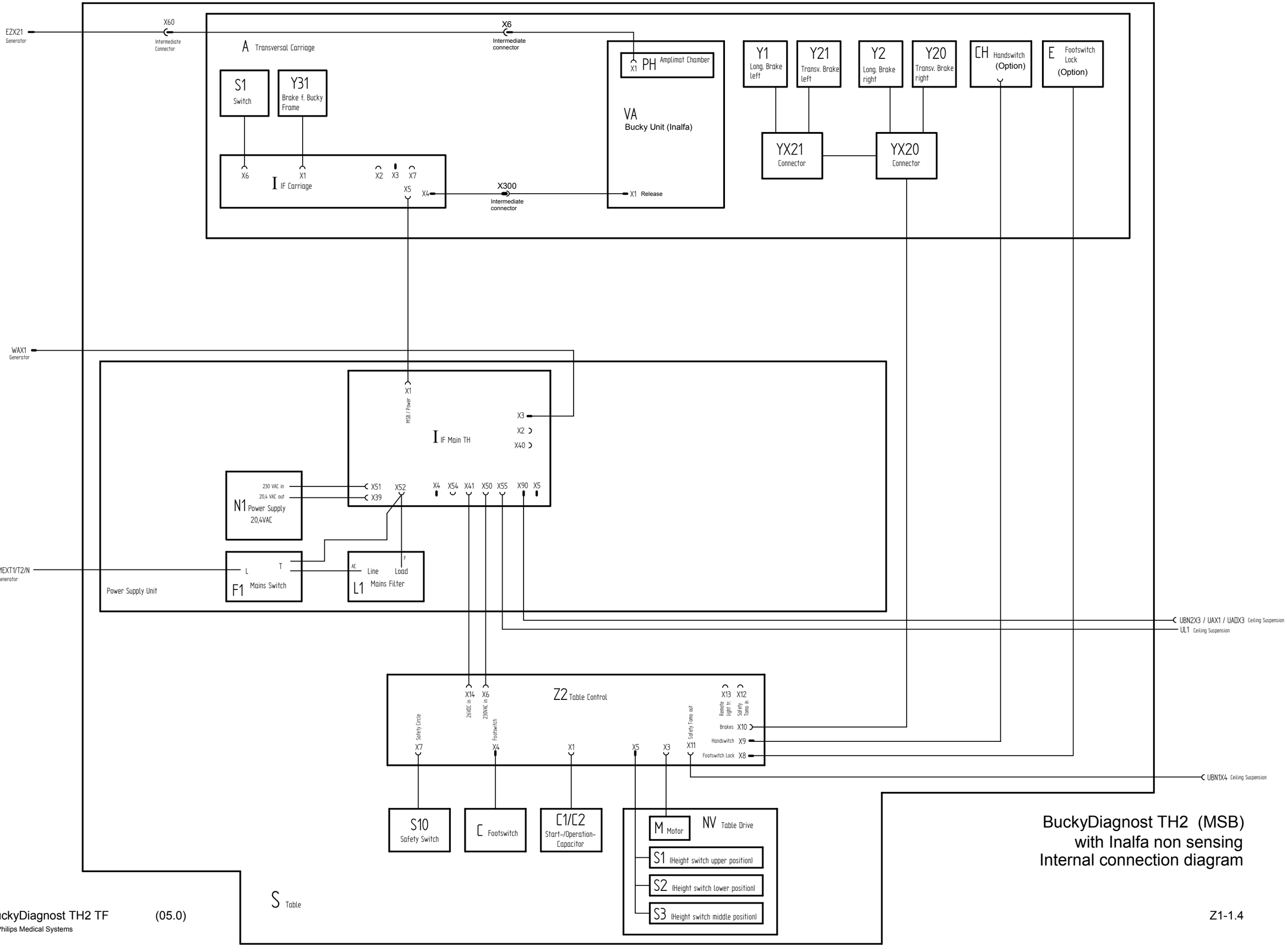

EZX21
Generator
X60
Intermediate Connector
A Transversal Carriage
S1
Switch
Y31
Brake f. Bucky Frame
E
X5 Encoder
X2 Motor
M
N1 Tomo (Option)
Power
CAN in
X1
X3
X8
X10
X6
X1
I IF Carriage
X2
X3
X7
X5
X4
X300
X1 PH Amplimat Chamber
VA
Bucky Unit (Inalfa)
X1 Release
Sensing X2
X100
gender changer
Y1
Long. Brake Left
Y21
Transv. Brake Left
Y2
Long. Brake right
Y20
Transv. Brake right
CH Handswitch (Option)
E Footswitch Lock (Option)
YX21
Connector
YX20
Connector
Signal-Bus EZX23
CAN out EZX43
X1
MSB / Power
I IF Main TH
X3
X2
X40
X1 Signal-Bus
X2 CAN in
X13 Grid Control
X3 CAN out
X6 26Vdc in
X9
Sensing
Z1 Bucky Controller
release BwS/ grd control
sensing BwS
position BwS
tracking BwS
remote
safety Tomo
X12
X10
X11
X5
X7
X8
X4
X20
only for BuckyDiagnost VS
230 VAC in
20,4 VAC out
N1 Power Supply 20,4VAC
X51
X39
X52
X4
X54
X41
X50
X55
X90
X5
MEXT1/T2/N
Generator
L
T
F1 Mains Switch
AE
Line
Load
L1 Mains Filter
Power Supply Unit
Z1X20.1
BuckyDiagnost VS VPIX10
BuckyDiagnost VS VPIX7
BuckyDiagnost VE/VT
VPX1
VP1X2
VP1X3
VP1X5
UBN2X3 / UAX1 / UADX3 Ceiling Suspension
UL1 Ceiling Suspension
UBN1X4 Ceiling Suspension
Z2 Table Control
X14
X6
26VAC in
230VAC in
Footswitch
X7
Safety Circle
X4
X1
X5
X3
X11
Safety Tomo out
X13
X12
Remote light tr.
Safety Tomo in
Brakes X10
Handswitch X9
Footswitch Lock X8
U
SID-Poti
Service Interface
S10
Safety Switch
C Footswitch
C1/C2
Start-/Operation-Capacitor
M Motor
NV Table Drive
S1 (Height switch upper position)
S2 (Height switch lower position)
S3 (Height switch middle position)
S Table
A1/A3 05-01-26 Schr.
BuckyDiagnost TH2 (MSB)
with Inalfa sensing
Internal connection diagram
BuckyDiagnost TH2 TF (05.0)
Philips Medical Systems
Z1-1.2



A1/A3 05-01-26 Schr.

BuckyDiagnost TH2 (MSB) with ACL 4 Internal connection diagram

©Philips Medical Systems



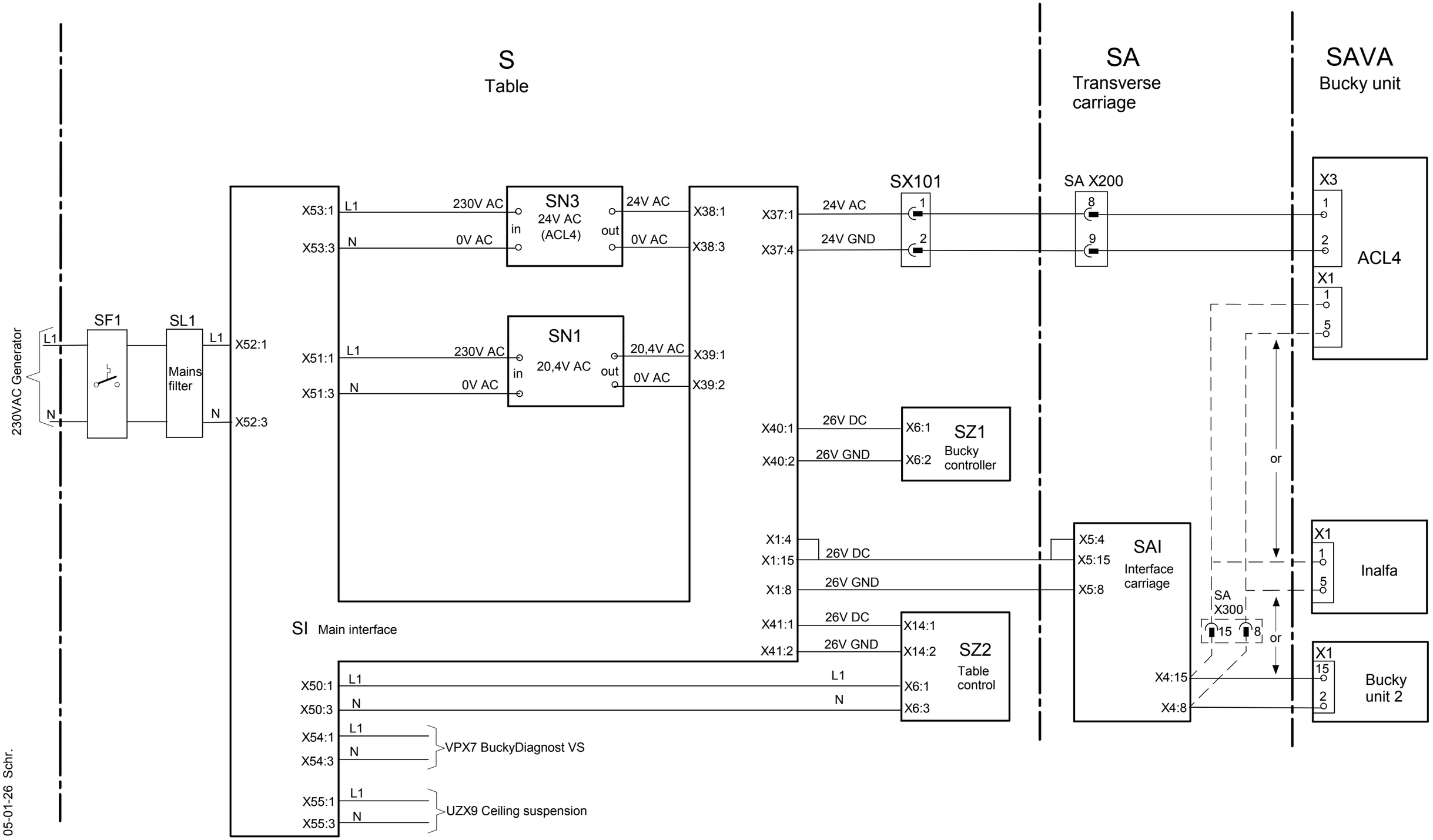
A1/A3 05-01-26 Schr.

BuckyDiagnost TH2 (MSB) with Inalfa non sensing Internal connection diagram

BuckyDiagnost TH2 TF (05.0)

©Philips Medical Systems

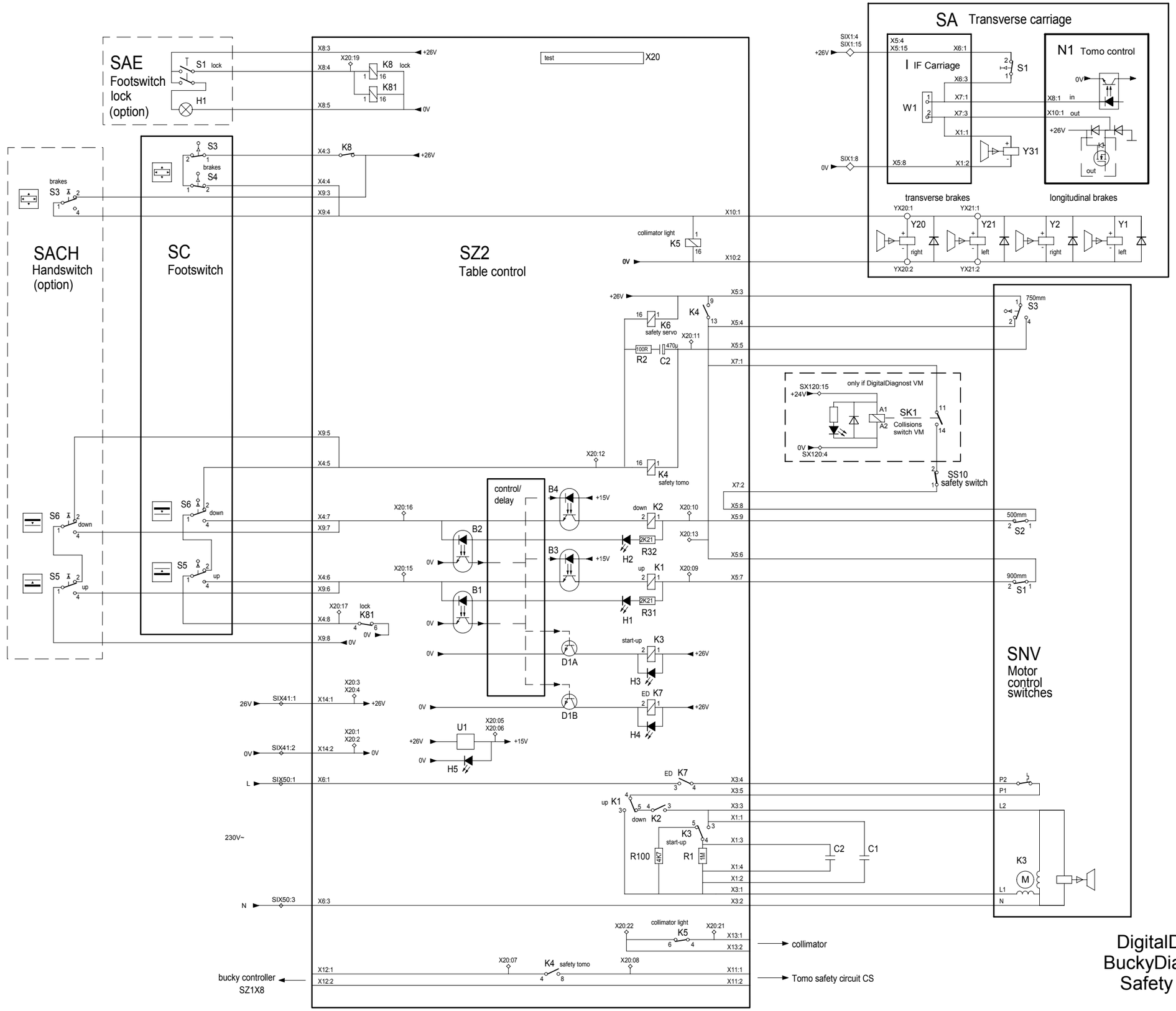
Z1-1.4



A3 05-01-26 Schr.

BuckyDiagnost TH2 (MSB)
Power supply

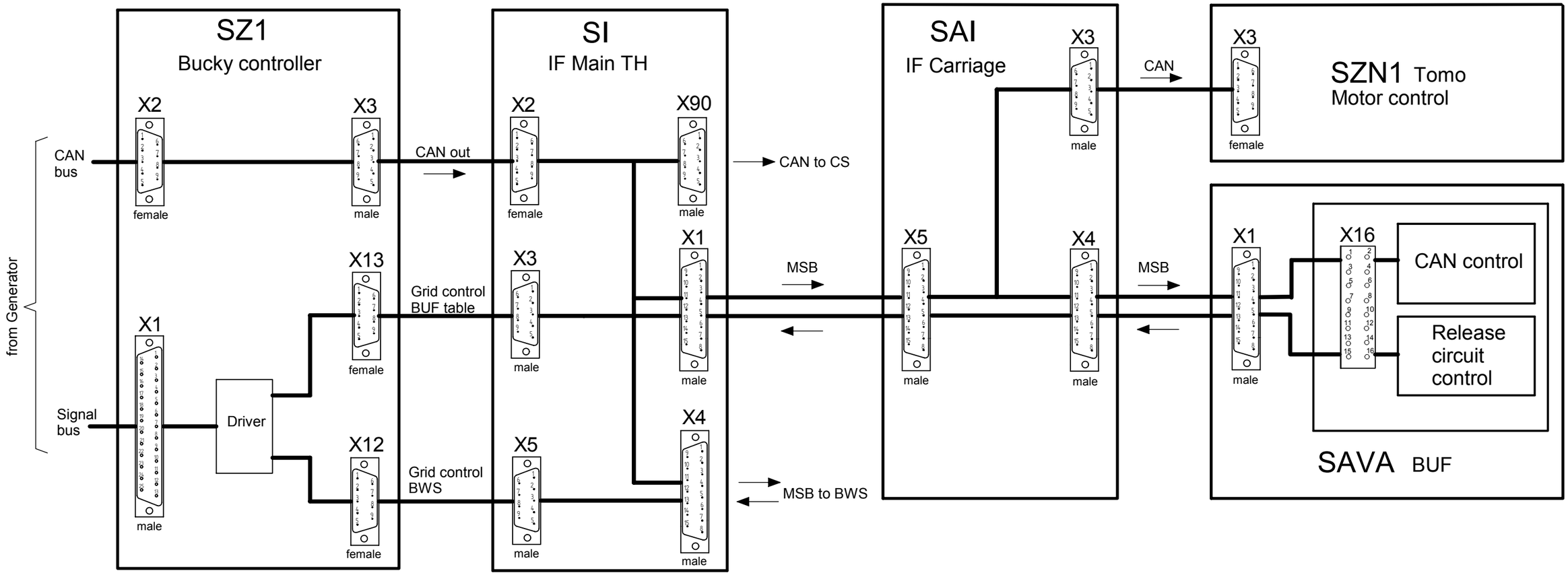
©Philips Medical Systems

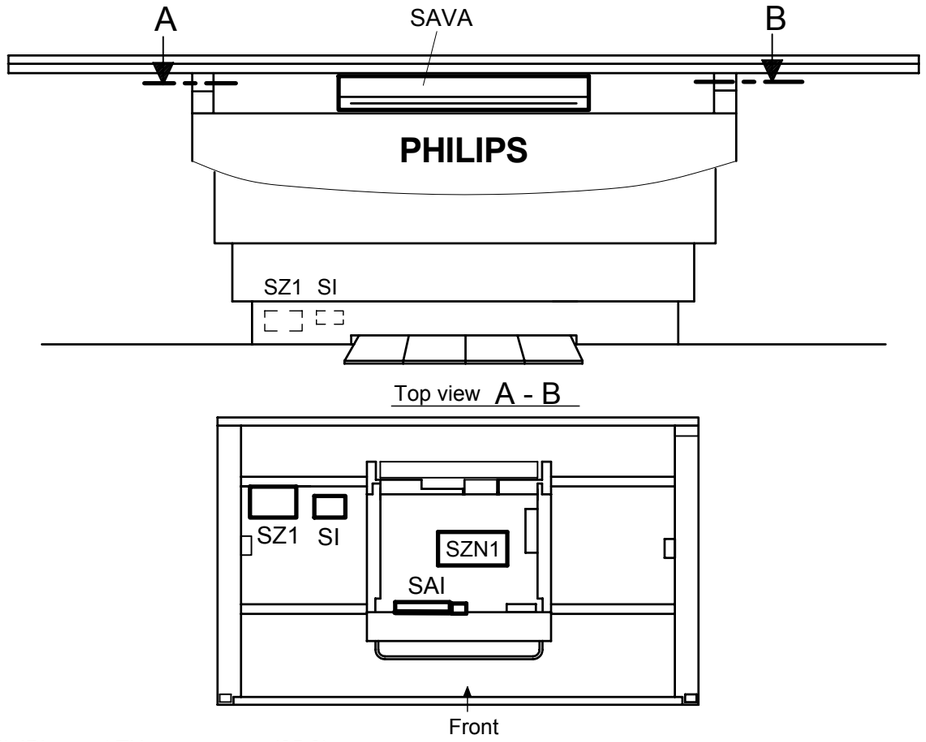


A1/A3 05-01-26 Schr.

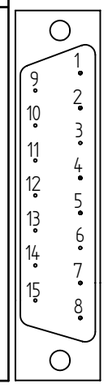
DigitalDiagnost TH (BUF)
BuckyDiagnost TH2 (MSB)
Safety circuit and brakes

ⓒ1999 Philips Medical Systems
ALL RIGHTS RESERVED

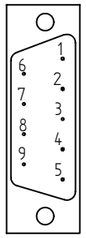




MSB Signal	Pin connector
CAN GND	1
CAN L in	2
CAN L out	3
not used	4
not used	5
sync grid GND	6
sync grid	7
26V DC GND	8
CAN 15V	9
CAN H in	10
CAN H out	11
not used	12
start grid	13
start grid GND	14
26V DC	15



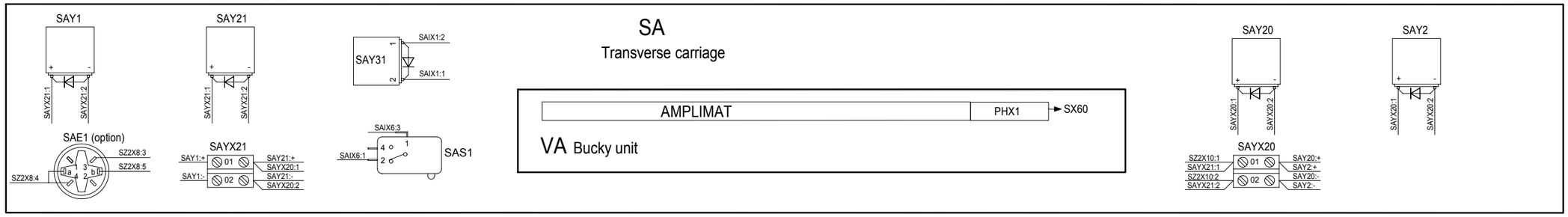
CAN Signal	Pin connector
not used	1
CAN L	2
CAN GND	3
not used	4
not used	5
CAN GND	6
CAN H	7
SW reset CAN	8
CAN 15V	9

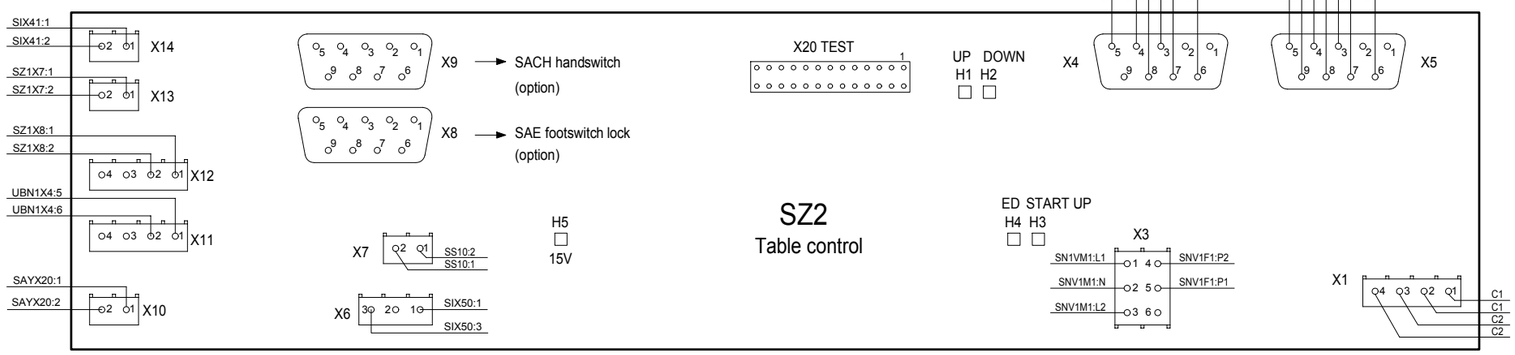


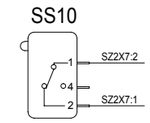
DigitalDiagnost TH (BUF)
BuckyDiagnost TH2 (MSB)
CAN + MSB bus

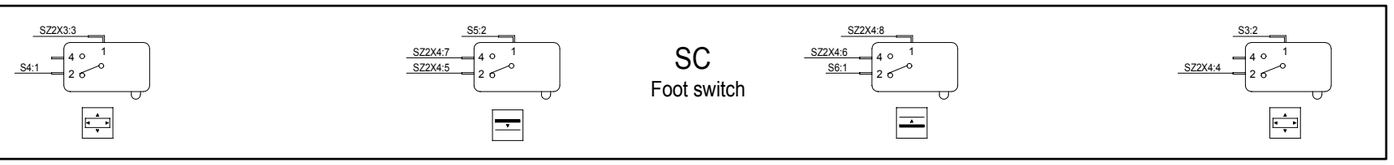
A3 05-01-26 Schr.

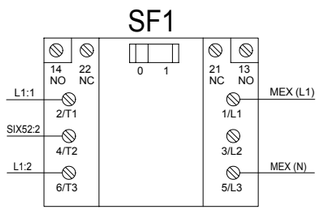
© Philips Medical Systems

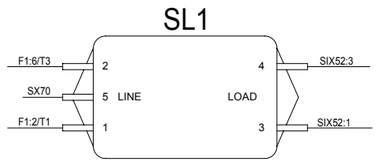


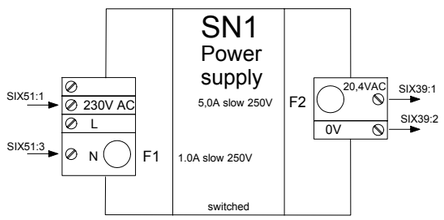


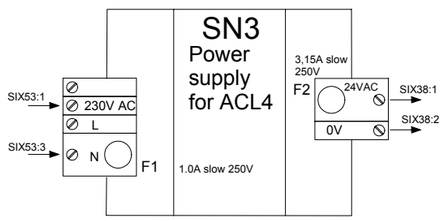


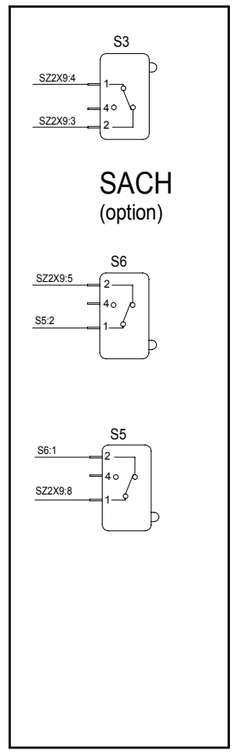


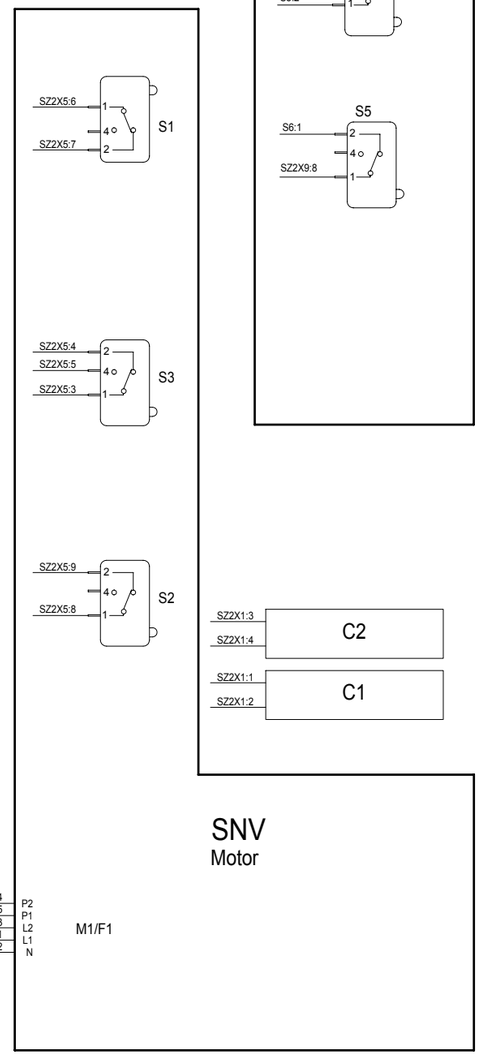












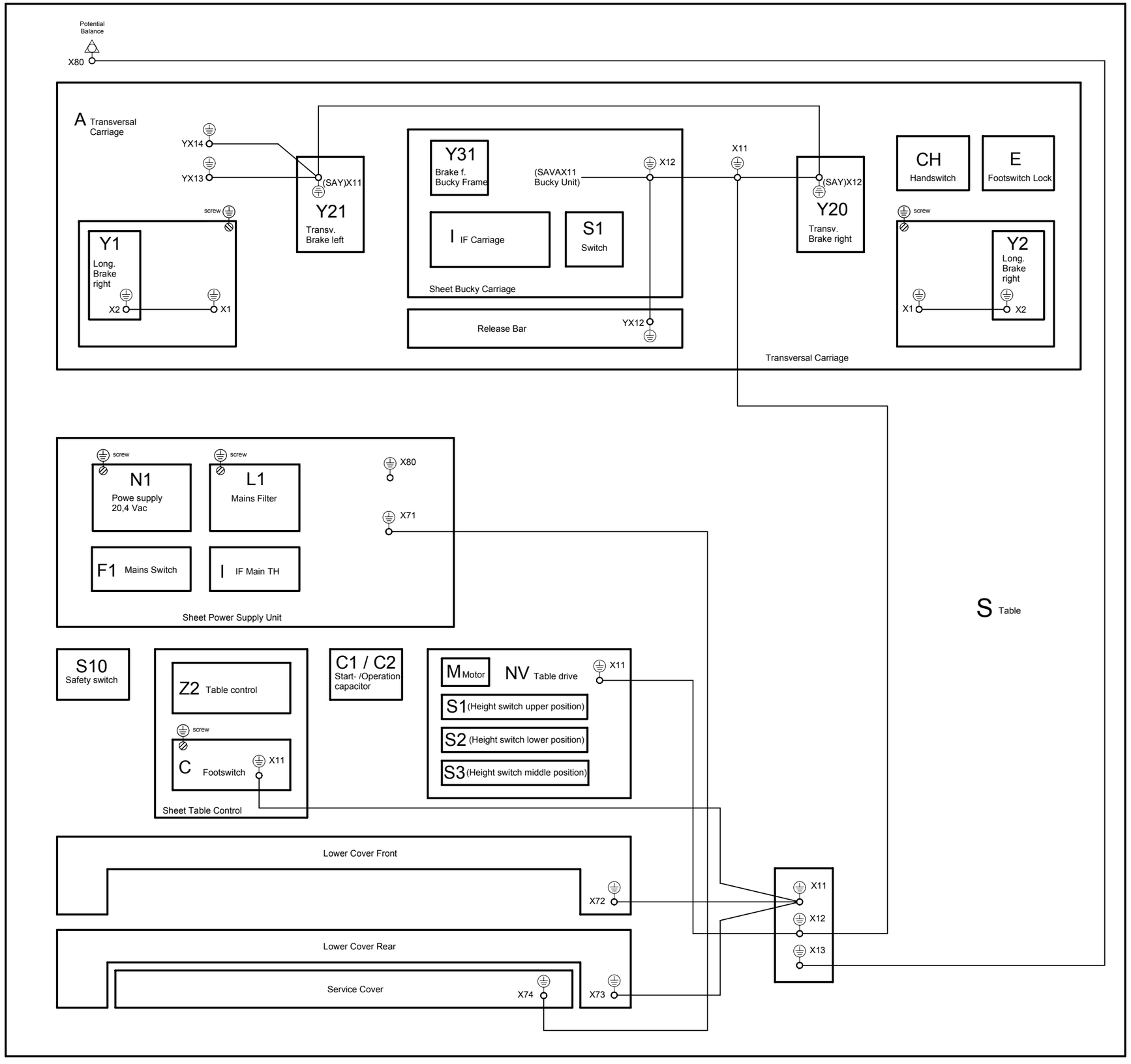
A1/A3 05-01-26 Schr.

BuckyDiagnost TH2 (MSB)
Wiring diagram

BuckyDiagnost TH2 TF (05.0)

Z2-1

ⓒ Philips Medical Systems
ALL RIGHTS RESERVED



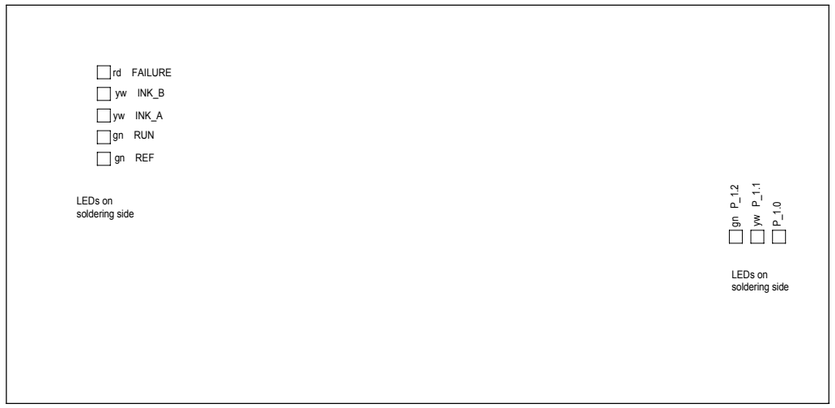
A1/A3 05-01-26 Schr.

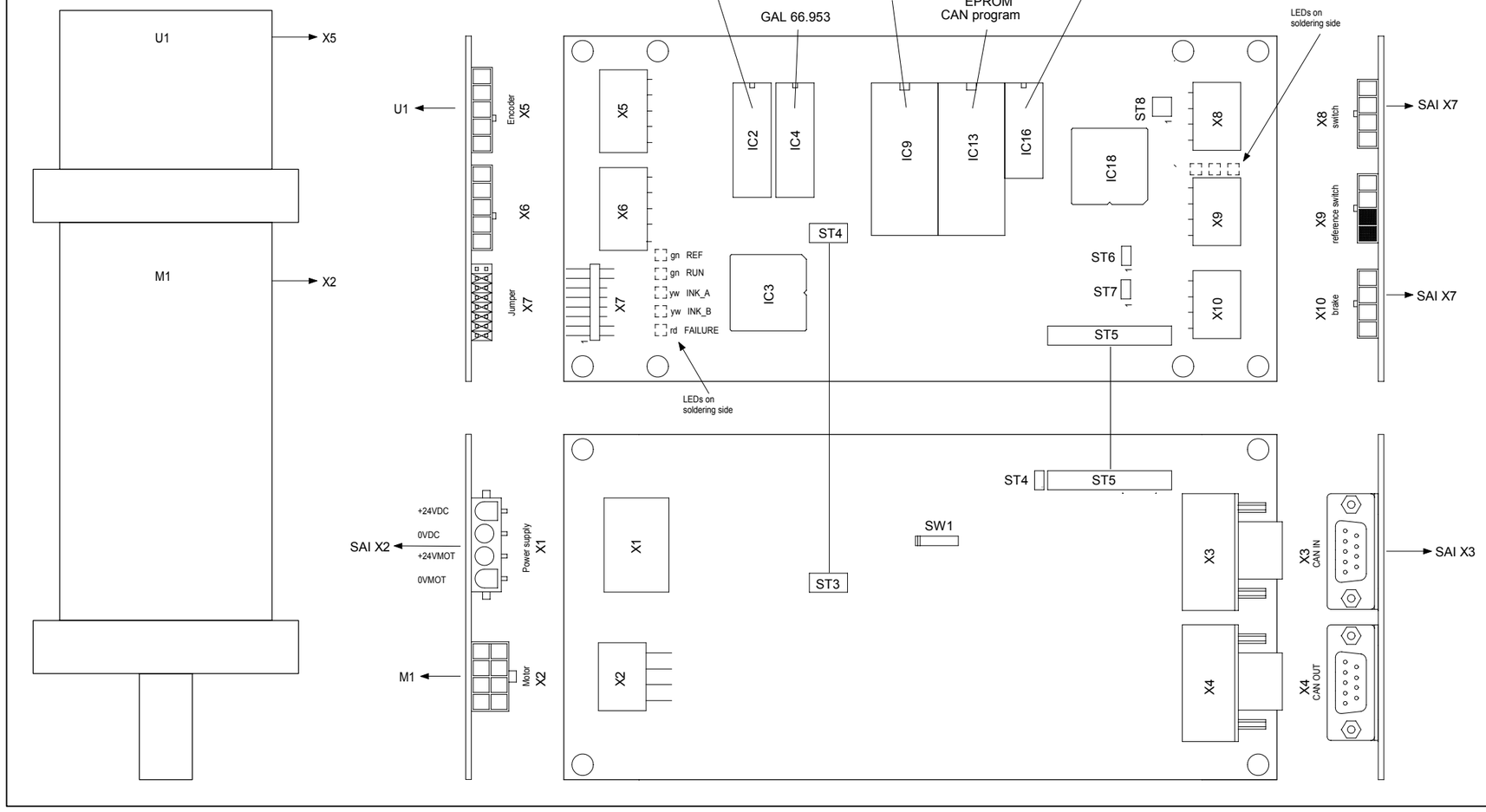
BuckyDiagnost TH2 (MSB)
Earthing diagram

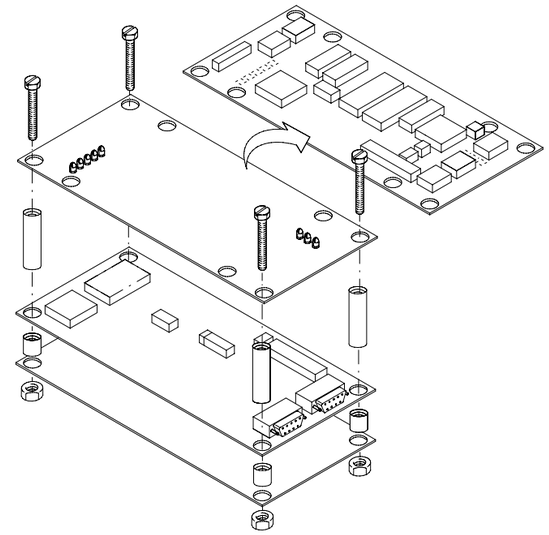
© Philips Medical Systems

SAN1

Tomo drive control





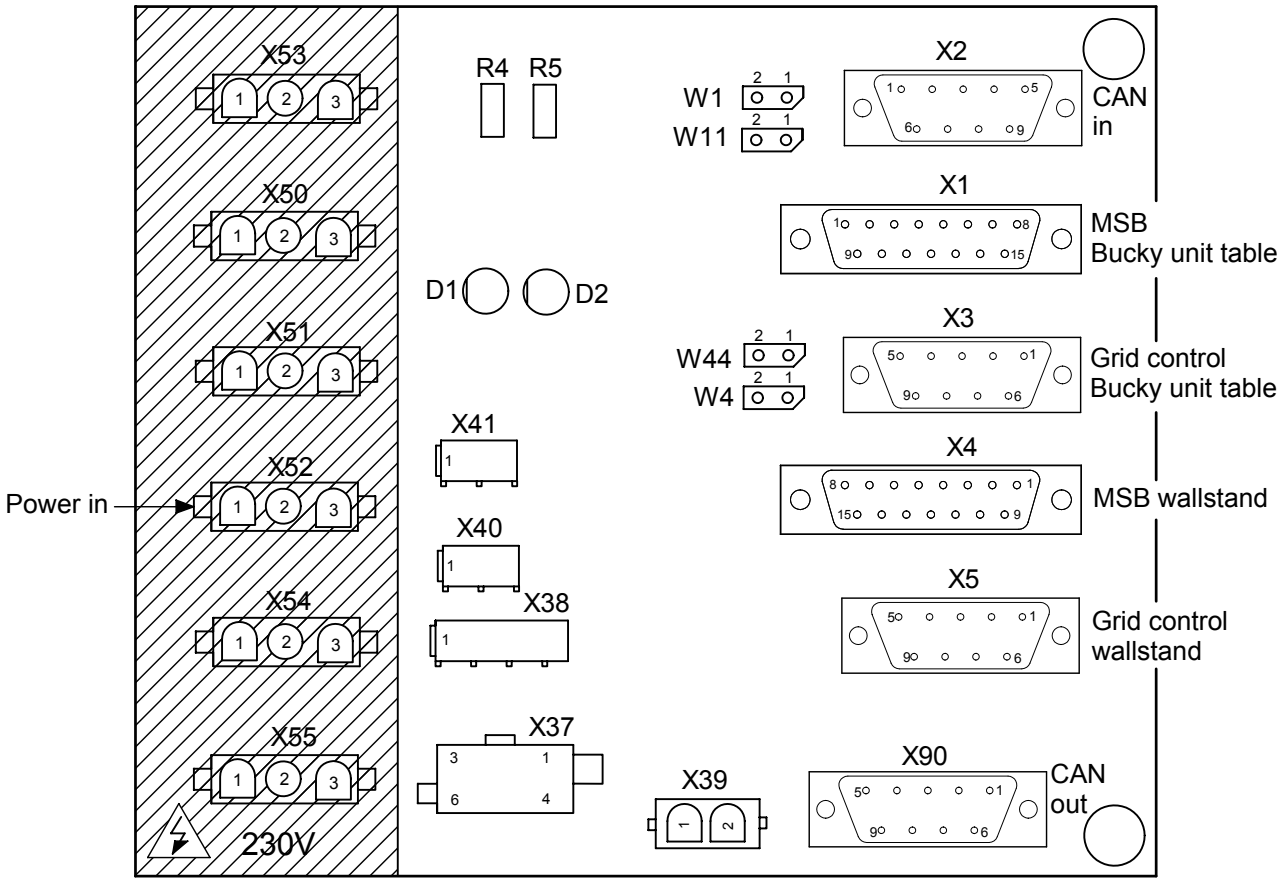


insolation plate

A1/A3 05-01-26 Schr.

Tomo drive control
Survey of components

ⓒ Philips Medical Systems
ALL RIGHTS RESERVED



D1 = +26 VDC
D2 = +26 MSB
R4 +R5 = Multi fuses (1,85A)

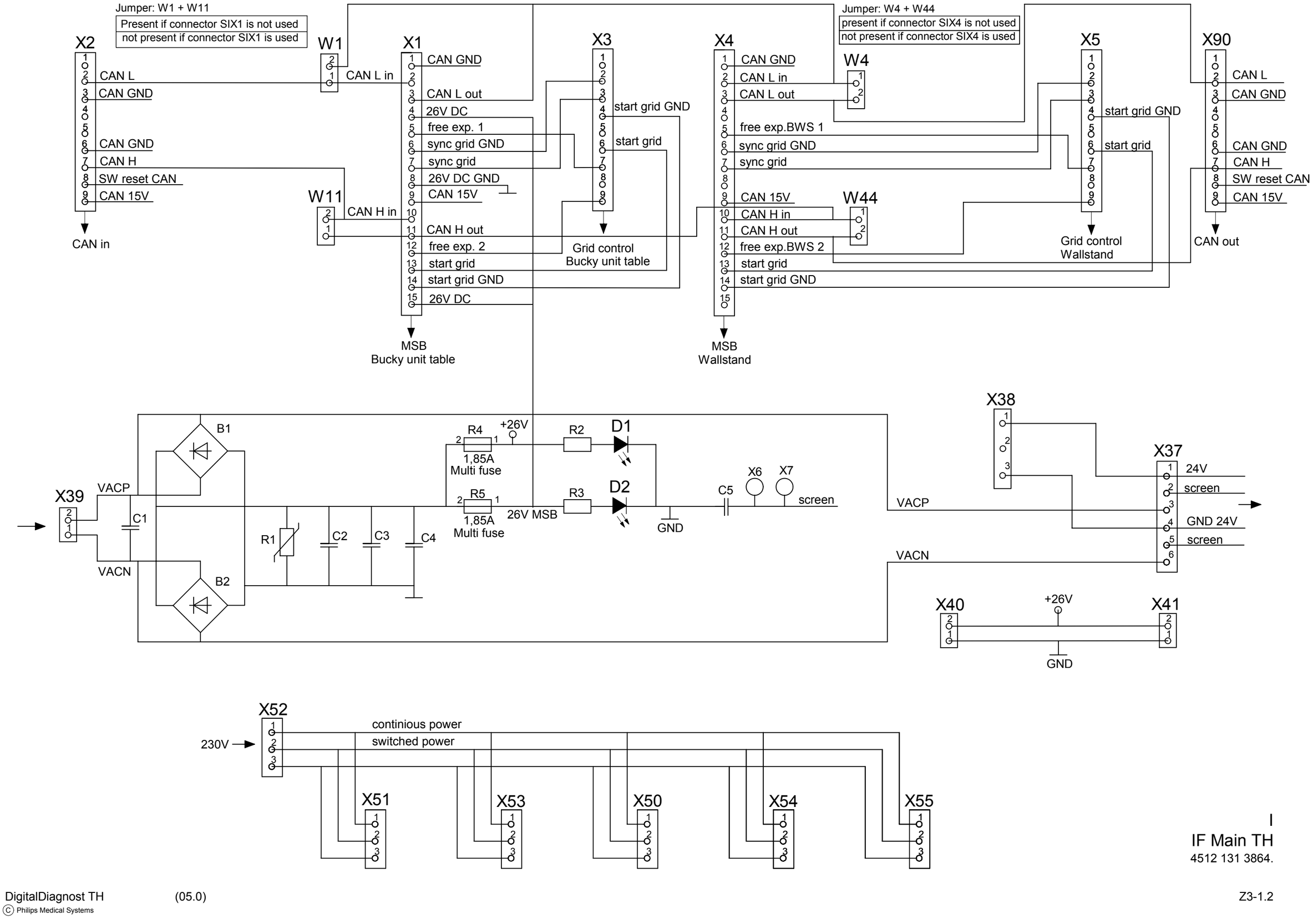
Jumper:

W1 + W11	present if connector SIX1 is not used
	not present if connector SIX1 is used
W4 + W44	present if connector SIX4 is not used
	not present if connector SIX4 is used

A4 04-11-23 Schr.

I
IF Main TH
4512 131 3864.

© Philips Medical Systems

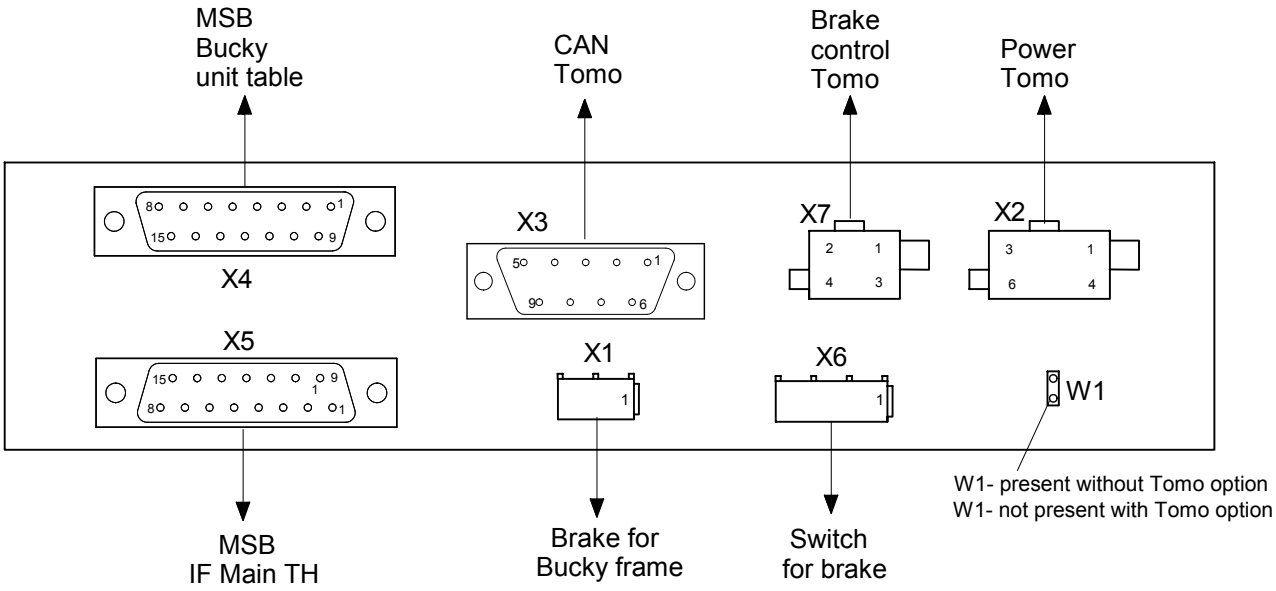


A3 05-01-26 Schr.

I
IF Main TH
4512 131 3864.

© Philips Medical Systems

Z3-1.2



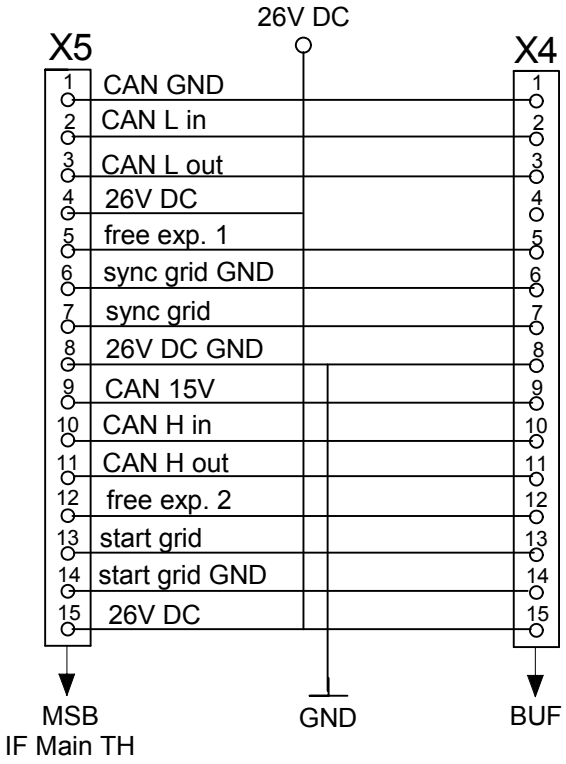
A4 04-11-23 Schr.

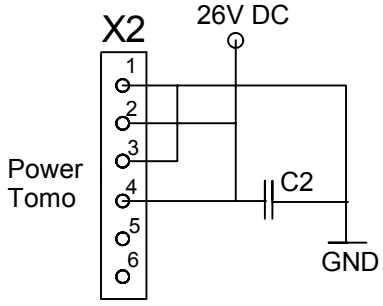
AI

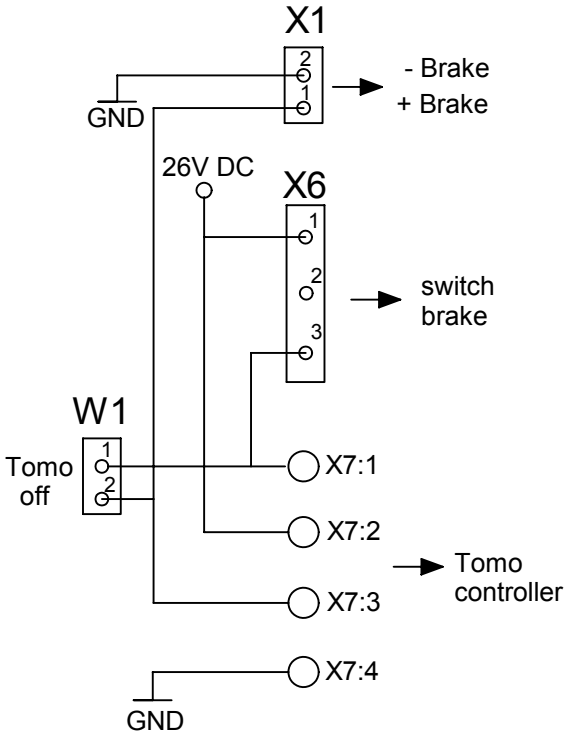
IF Carriage

4512 131 3863.

© Philips Medical Systems



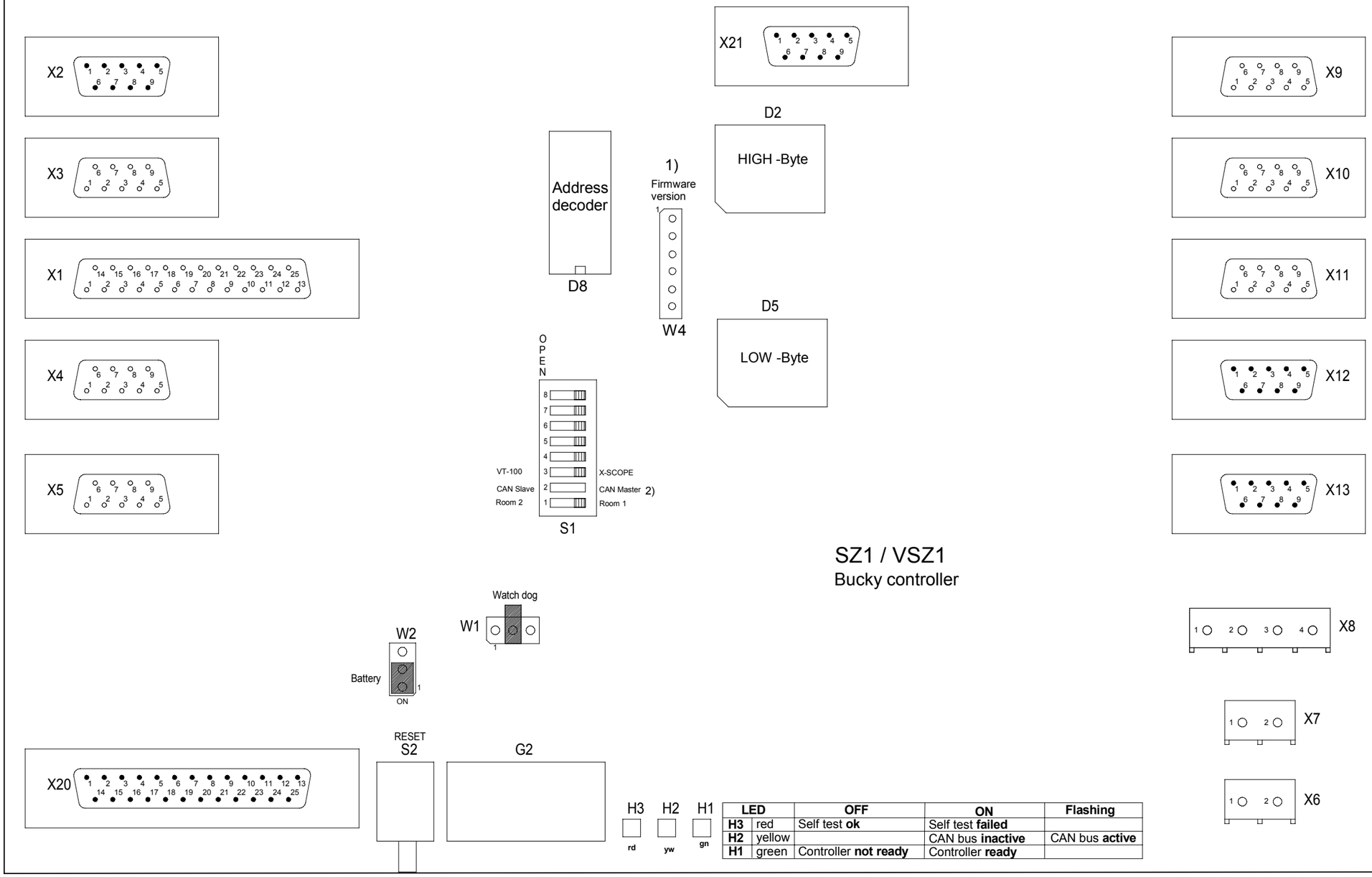




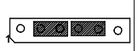
A4 04-11-23 Schr.

AI
IF Carriage
4512 131 3863.

© Philips Medical Systems



LED		OFF	ON	Flashing
H3	red	Self test **ok**	Self test **failed**	
H2	yellow		CAN bus **inactive**	CAN bus **active**
H1	green	Controller **not ready**	Controller **ready**	

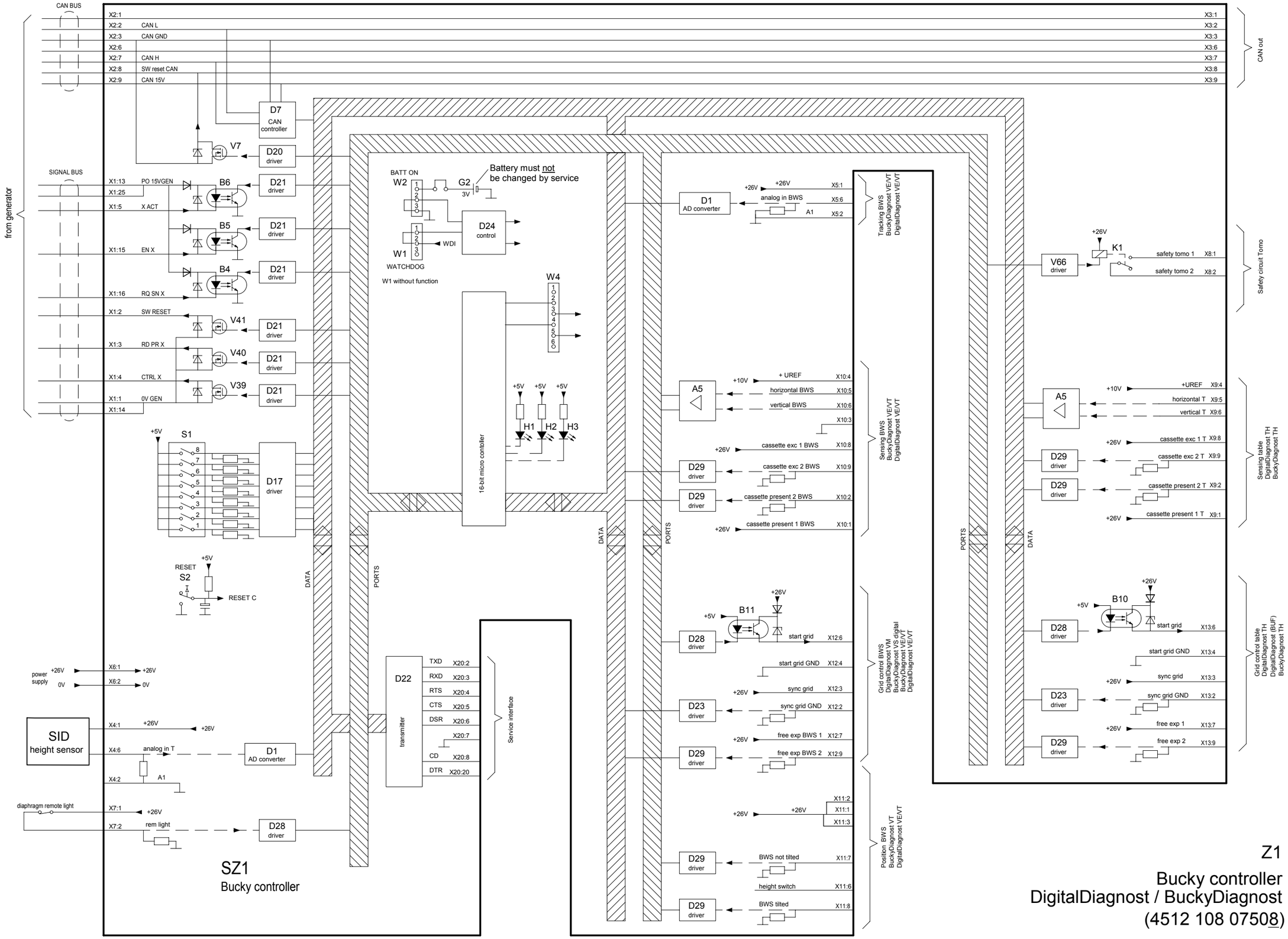
1) System	application SW workstation	bucky controller FW release	LOW-Byte	HIGH-Byte	Address decoder D8	Jumper W4	
BuckyDiagnost	-	6.2	24412	24422	18991	1-2 / 5-6	
DigitalDiagnost	1.3	7.2	 25072	 25082			
	1.3.1	8.1	 25073	 25083			
	1.4	9.1	25531	25541	25511	2-3 / 4-5	
	1.4.1	9.2	25532	25542			
BuckyDiagnost	-						

2) System	Dip Switch S1:2
BuckyDiagnost	closed (master)
DigitalDiagnost	open (slave)
EasyDiagnost Eleva	closed (master)

A1/A3 05-06-13 Schr.

SZ1 / VSZ1
Bucky controller
DigitalDiagnost / BuckyDiagnost
(4512 108 07508)

© Koninklijke Philips Electronics N.V.
ALL RIGHTS RESERVED

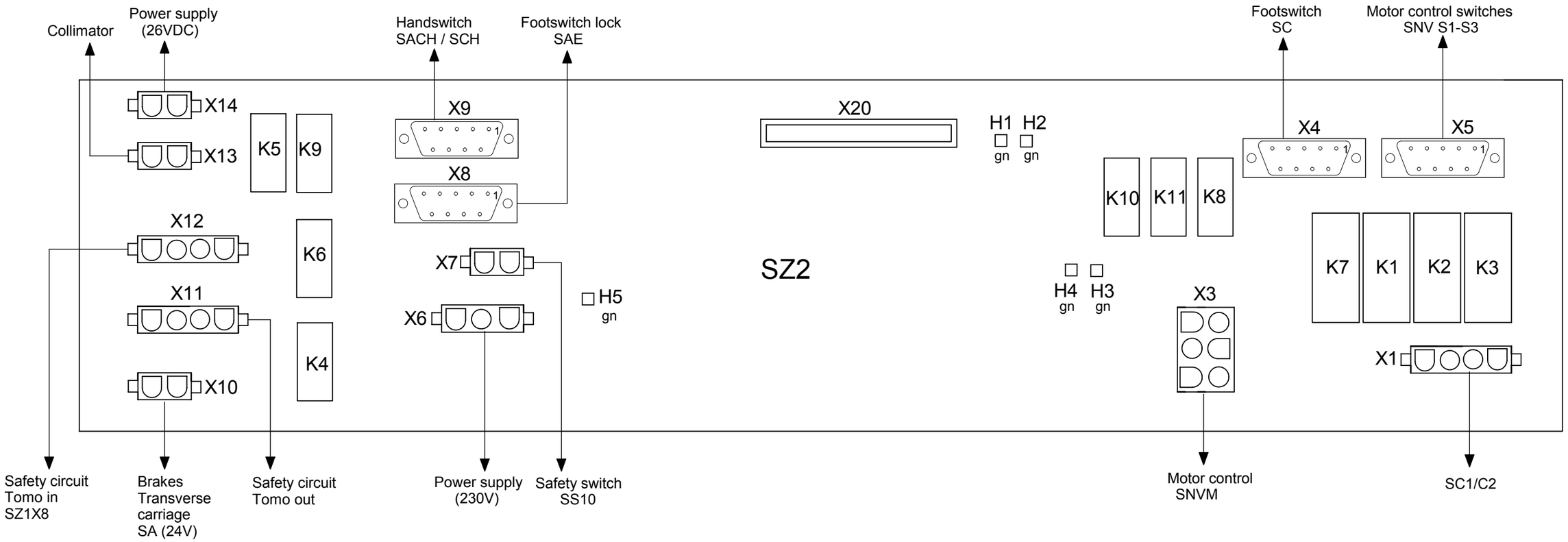


A1/A3 04-12-09 Schr.

Z1

Bucky controller
DigitalDiagnost / BuckyDiagnost
(4512 108 07508)

©1999 Philips Medical Systems
ALL RIGHTS RESERVED



A3 05-01-26 Schr.

SZ2
Table control

© Philips Medical Systems